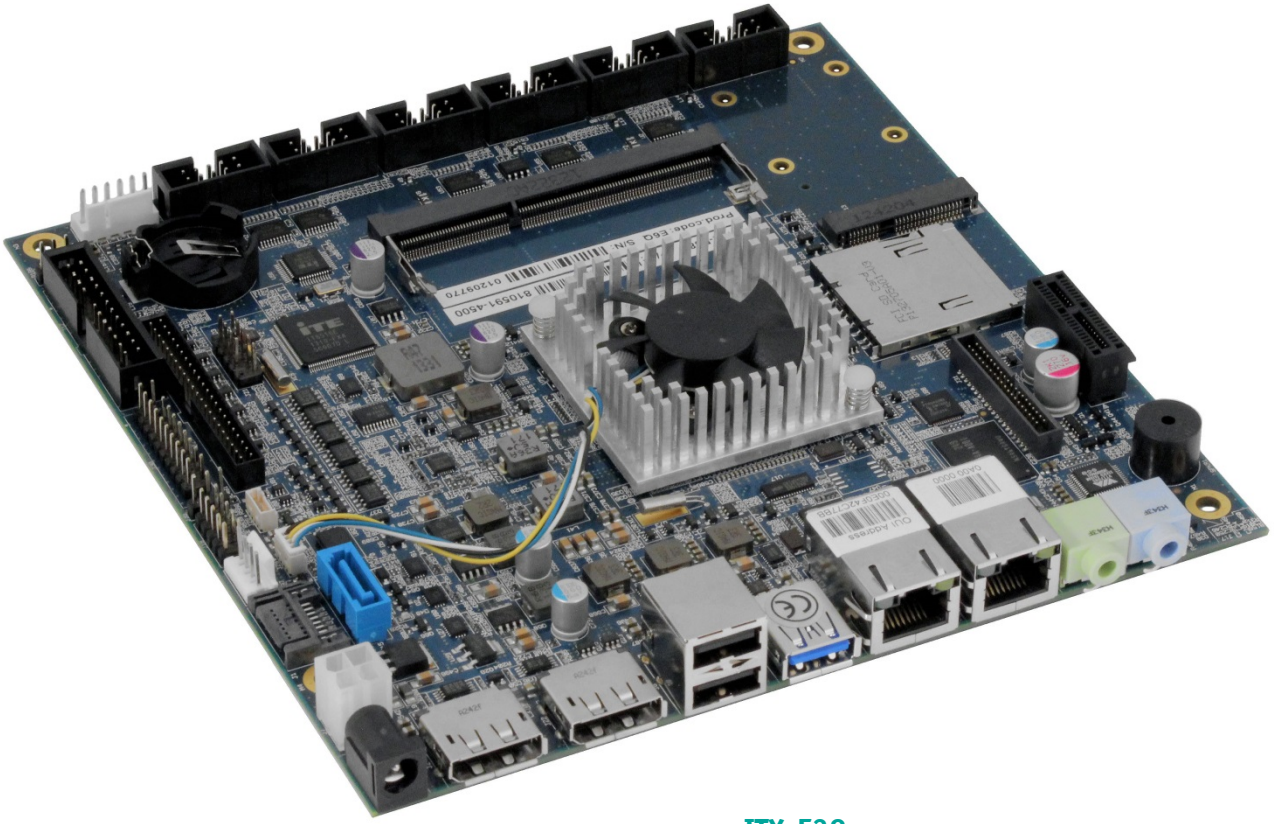
» Kontron User's Guide «



mITX-E38

(Thin Mini-ITX size)

KTD-N0903-C

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Document Revision History

Revision	Date	By	Comment
C	January 27th 2015	MLA	USB0 and USB3 swapped. Doc header in BIOS part corrected. "Flex" info removed. Minor corrections. Added board PN to introduction table.
B	January 26th 2015	MLA	Fan Thermal Cruise corrected to Speed Cruise. ITE8517 corrected to IT8768E. "Thin Mini-ITX size" has been added. Corrected LPC (J30) description. Added System Memory Support. EXT_BAT max. 3.47 V. Added IO Bracket info and warning changing cooling system. BIOS part added.
A	August 21st 2014	MLA	Added Cooler info. Improved DC power jack description. Updates. Mating connectors.
0	April 4th 2014	MLA	Preliminary version

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Before Contacting Support: Please be prepared to provide as much information as possible:

- CPU Board
  1. Type.
  2. Part Number (find PN on label)
  3. Serial Number if available (find SN on label)
- Configuration
  1. DRAM Type and Size.
  2. BIOS Revision (find the version info in the BIOS Setup).
  3. BIOS Settings different than *Default* Settings (refer to the BIOS Setup section).
- System
  1. O/S Make and Version.
  2. Driver Version numbers (Graphics, Network, and Audio).
  3. Attached Hardware: Harddisks, CD-Rom, LCD Panels etc.

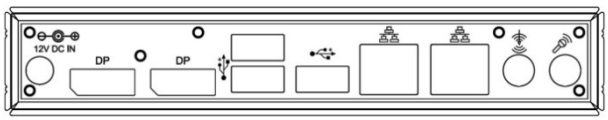
If the Kontron Technology product seems to be defect and you want to return it for repair, please follow the guide lines from the following page:

http://kontron.com/services/rma-information/kontron-technology-a-s/

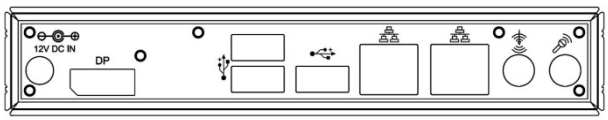
1 Introduction

This manual describes the mITX-E38 boards made by KONTRON Technology A/S. The boards will also be denoted E38. The E38 boards are based on Intel Atom E38xx SOC (System On Chip) and will be available in three versions having 1, 2 or 4 cores. The differences between the three types of boards are listed in this table:

Feature	mITX-E3815	mITX-E3826	mITX-E3845
mITX-E38 PN	810592-4500	810591-4500	810590-4500
Bay Trail SOC	E3815 (1 core)	E3826 (2cores)	E3845 (4 cores)
Core speed	1,46GHz	1,46GHz	1,91GHz
Total Design Power	5W	7W	10W
Integrated cooler	Passive	Passive	Active
Graphics	2x DP	2x DP	DP + LVDS
IO Bracket (included)	PN 1056-0953	PN 1056-0953	PN 1056-0955
Onboard eMMC	-	-	16GB TLC NAND
SD Card slot	-	Yes	Yes
TPM	-	-	Yes
COM ports	2x RS232	6x RS232	6x RS232
USB	1x USB3.0/2.0 3x USB2.0	1x USB3.0/2.0 3x USB2.0	1x USB3.0/2.0 7x USB2.0



1056-0953 mITX-E38-IO bracket 2xDP



1056-0955 mITX-E38-IO bracket 1xDP

Warning: If changing the premounted cooling system, then the system might get overheated resulting in instable system or defects if the cooling system is sufficient.

Use of this Users Guide implies a basic knowledge of PC-AT hard- and software. This manual is focused on describing the E38 board's special features and is not intended to be a standard PC-AT textbook.

New users are recommended to study the short installation procedure stated in the following chapter before switching-on the power.

All configuration and setup of the CPU board is either done automatically or manually by the user via the BIOS setup menus. Only exceptions are the "Clear CMOS" Jumper and the "Always On" jumper.

Latest revision of this manual, datasheet, BIOS, drivers, BSP's (Board Support Packages), Mechanical drawings (2D and 3D) can be downloaded from here: http://www.kontron.com/products/boards-and-mezzanines/embedded-motherboards/

2 Installation Procedure

2.1 Installing the Board

To get the board running follow these steps. If the board shipped from KONTRON has already components like RAM and CPU cooler mounted, then relevant steps below can be skipped.

1. **Turn off the PSU (Power Supply Unit)**

Warning: Turn off PSU (Power Supply Unit) completely (no mains power connected to the PSU) or leave the Power Connectors unconnected while configuring the board. Otherwise components (RAM, LAN cards etc.) might get damaged. Make sure to use +12V single supply only. Alternatively use a standard ATX PSU with suitable cable kit and PS_ON# active.

2. **Insert the DDR3L SODIMM module**
   For a list of approved DDR3 DIMMs contact your Distributor or FAE. See also chapter "System Memory Support".

3. **Cooler Installation**
   Normally the cooler is premounted, but in case not, then make sure the heat paste etc. on the cooler is intact and cover the full area of the SOC. Connect Cooler Fan electrically to the FAN_CPU connector.

4. **Connecting Interfaces**
   Insert all external cables for hard disk, keyboard etc. A monitor must be connected in order to change BIOS settings.

5. **Connect and turn on PSU**
   Connect PSU to the board by the Int12V connector or the Ext12V connector. Please note that current limitations apply, see relevant connector description.

6. **Power Button**
   If the board does not start by itself when switching on the ATX PSU AC mains, then follow these instructions to start the board. Install the Always On Jumper in the Always On position or toggle the PWRBTN_IN# signal (available in the FRONTPNL connector), by momentary shorting pins 16 (PWRBTN_IN#) and pin 18 (GND). A "normally open" switch is recommended.

7. **BIOS Setup**
   Enter the BIOS setup by pressing the <F2> key during boot up.
   Enter "Exit Menu" and Load Setup Defaults.
   Refer to the "BIOS Configuration / Setup" section of this manual for details on BIOS setup. Please note that BIOS may boot in UEFI shell, if so then type exit to activate BIOS menu and select Set-up.

Note: To clear all BIOS settings, including Password protection, activate "Load Default BIOS Settings" Jumper for ≈10 sec (without power connected).

8. Mounting the board in chassis

Warning: When mounting the board to chassis etc. please notice that the board contains components on both sides of the PCB which can easily be damaged if board is handled without reasonable care. A damaged component can result in malfunction or no function at all.

When fixing the Motherboard on a chassis it is recommended using screws with integrated washer and a diameter of ≈7mm. Do not use washers with teeth, as they can damage the PCB and cause short circuits.

2.2 Requirements IEC60950

Take care when designing chassis interface connectors in order to fulfil the IEC60950 standard.

When an interface or connector has a VCC (or other power) pin which is directly connected to a power plane like the VCC plane:
To protect the external power lines of the peripheral devices the customer has to ensure:

- Wires have suitable rating to withstand the maximum available power.
- That the enclosure of the peripheral device fulfils the fire protecting requirements of IEC60950.

Lithium battery precautions

CAUTION! Danger of explosion if battery is incorrectly re- placed. Replace only with same or equivalent type recommended by manufacturer. Dispose of used batteries according to the manufacturer's instruc- tions.	**VORSICHT!** Explosionsgefahr bei unsachgemäßem Austausch der Batterie. Ersatz nur durch den selben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Anga- ben des Herstellers.
ATTENTION! Risque d'explosion avec l'échange inadéquat de la batterie. Remplacement seulement par le même ou un type équivalent recommandé par le producteur. L'évacuation des batteries usagées conformément à des indications du fabricant.	**PRECAUCION!** Peligro de explosión si la batería se sustituye incorrectamente. Sustituya solamente por el mismo o tipo equivalente recomendado por el fabricante. Disponga las baterías usadas según las instrucciones del fabricante.
ADVARSEL! Lithiumbatteri – Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.	**ADVARSEL!** Eksplosjonsfare ved feilaktig skifte av batteri. Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten. Brukte batterier kasseres i henhold til fabrikantens instruksjoner.
VARNING! Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.	**VAROITUS!** Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan lalteval- mistajan suosittelemaan tyyppiln. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

3 System Specifications

3.1 Component main data

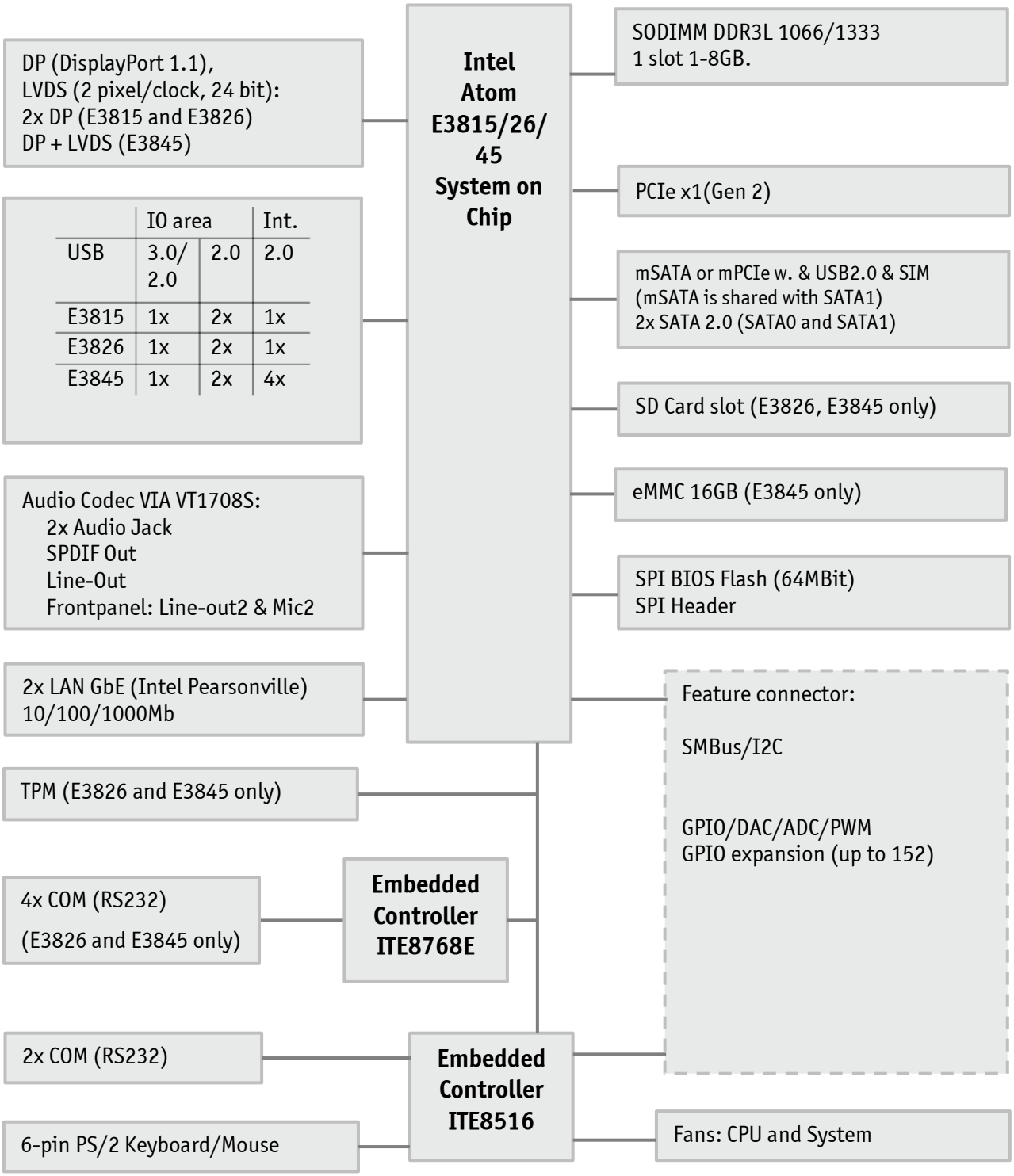
Form factor	mITX (miniITX) 170,18 mm by 170,18 mm (Thin Mini-ITX size).
Processor	Intel Bay Trail FCBGA1170 Type 3 27x25mm 0.593 Ball Pitch. Three versions available: E3815 (1 core), 1,46GHz, 5W E3826 (2 core), 1,46GHz, 7W E3845 (4 core), 1,91GHz, 10W
Memory	1x DDR3L SODIMM socket supporting single-channel unbuffered DDR3L 1066/1333MHz (PC3-8500/10600). pITX-E3815/E3826 supports only DDR3-1066MHz. Up to 4GB (Intel specification) however Kontron has qualified 8GB. (ECC not supported).
Flash	eMMC 16GB TLC Nand. E3845 only.
SD card slot	1x SD Card Slot, SD Card 3.0 interface. E3826 and E3845 only. • Up to 832Mbits per second data rate using up to 4 parallel data lines. • Transfers the data in following UHS-I modes: HS and DDR50. • Cyclic Redundancy Check CRC7 for command and CRC16 for data integrity. • Designed to work with I/O cards, Read-only cards and Read/Write cards. • Supports Read wait Control. SDIO only validated with WIFI devices.
SATA	2x SATA Gen2 (3.0/1.5Gb/s). SATA1 and SATA2. Notes: RAID is not supported. SATA1 shared with mSATA, so that if mSATA is installed then the SATA1 is disabled.
LAN Support	2x 10/100/1000Mbits/s LAN (LAN1 & LAN2) based on Intel® Pearsonville I211AT • PXE Netboot supported. • Wake On LAN (WOL) supported
Serial	2x Serial ports (RS232) (COM1 – COM2), via ITE8516 4x Serial ports (RS232) (COM3 – COM6), via ITE8768E, E3826 and E3845 only.
USB	• 1x USB3.0/2.0 (Rear IO area, single USB port connector) • 2x USB2.0 (Rear IO area, dual USB port connector) • 1x USB2.0 (available in mPCIe slot) • 3x USB2.0 (Front Panel Connector and USB6 connector) E3845 only.
DP	DP (DisplayPort) v1.1a. Intel® Gen7 Graphics, OpenGL 3.0, OpenCL 1.2, DX11, H.264, MPEG2, MCV, VC-1, VP8. 2x DP (E3815 and E3826) 1x DP (E3845)
LVDS	LVDS panels up to 2 pixels per clock, 24 bit colors (VESA/JEIDA). Based on DP to LVDS converter type PTN3460BS. E3845 Only.

Audio	Audio, 7.1 Channel High Definition Audio Codec using the VIA VT1708S codec. • Line-in (Blue Jack connector). • Headphone stereo signals. (Shared Lime Jack and pin-row connector). • Headphone stereo signals. (Front Panel connector). • Microphones: MIC1 (MIC connector) and MIC2 (Front Panel connector). • SPDIF-Out (electrical Interface only). • On-board speaker (Electromagnetic Sound Generator like Hycom HY-05LF).
Expansion Capabilities	• 1x 1x mPCIe (w. USB2.0 and SIM card slot) (Shared with mSATA) • 1x PCIe x1 • SPI bus routed to SPI connector (BIOS Recovery module interface) • DDC/AUX Bus routed to DP connector (Auto detect to DDC when using passive DP to HDMI or DVI adapters) Via Feature connector based on ITE IT8516E Embedded Controller via LPC Bus interface • SMBus, compatible with ACCES BUS and I2C BUS • 18 x GPIOs (General Purpose I/Os) • DAC, ADC, PWM and TIMER (Multiplexed) • WAKE UP / Interrupt Inputs (Multiplexed) • 3 Wire Bus for GPIO Expansion (up to 152 GPIOs) • 8 bit Timer output
Hardware Monitor Subsystem	• Fan control support Speed cruise. • Thermal inputs: PCB near SOC temperature (precision +/- 3°C). • System temperature sensor (precision +/- 0.5°C) • Sleep S5# Indication, (via Feature connector) • System Powergood Signal, (via Feature connector)
Security	Integrated TPM 1.2 support. E3845 only.
Power Supply Unit	+12V single supply via either Vin-Int. (4-pin connector) or Vin-Ext. connector (DC Connector RA 2mm locking type)
Battery	Exchangeable 3.0V Lithium battery for on-board Real Time Clock and CMOS RAM. Manufacturer Panasonic / Part-number CR-2032L/BN, CR2032N/BN or CR-2032L/BE. Approximate 6.2 years retention. Current draw is less than 4.2µA when PSU is disconnected and 0 µA in S0 – S5. Note that Intel specifies that battery must be connected, however it is unspecified what is the risk of not using battery. When battery is not connected, Kontron has not been able to find any problems except for RTC not running. **CAUTION: Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.**
OS support (planned)	Windows 7 (32 and 64bit) and Windows 8 (32 and 64bit) Windows Embedded 7 and Windows Embedded 8 Linux WxWorks

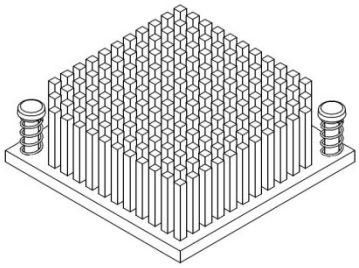
Environmental Conditions	**Operating:** 0°C – 60°C operating temperature. It is the customer's responsibility to provide sufficient airflow around each of the components to keep them within allowed temperature range. 10% - 90% relative humidity (non-condensing) **Storage:** -20°C – 70°C; lower limit of storage temperature is defined by specification restriction of on-board CR2032 battery. Board with battery has been verified for storage temperature down to -40°C by Kontron. 5% - 95% relative humidity (non-condensing) **Electro Static Discharge (ESD) / Radiated Emissions (EMI):** All Peripheral interfaces intended for connection to external equipment are ESD/ EMI protected. EN 61000-4-2:2000 ESD Immunity EN55022:1998 class B Generic Emission Standard. EN 61000-4-4 Burst Immunity **Safety:** IEC 60950-1: 2005, 2nd Edition UL 60950-1 CSA C22.2 No. 60950-1 Product Category: Information Technology Equipment Including Electrical Business Equipment Product Category CCN: NWGQ2, NWGQ8 File number: E194252 **Shock:** IAW IEC 60068-2-27, Test Ea, shock, 18 shocks 3 per axis, 6 directions. Shock pulse 50g, 11ms halfsine. **Bump:** IAW IEC 60068-2-29, Test Eb, Bump, 3000 bumps, 500 per axis, 6 directions. Half Sine Waveform Acceleration 2g; Pulse Duration 11ms. **Vibration:** IAW IEC 60068-2-64, Test Fh, Random Vibration. 90 min per axis, 3 axes, at 1.9 grms, with PSD: 10-20 Hz: 0.05 g^2/Hz and 20-500 Hz: -3dB/octave. **Theoretical MTBF:** 235.723 / 174.224 hours @ 40°C / 60°C **Restriction of Hazardous Substances (RoHS):** All boards in the mITX E38 family are RoHS compliant. **Capacitor utilization:** No Tantalum capacitors on board Only Japanese brand Solid capacitors rated for 100 °C used on board

3.2 System overview

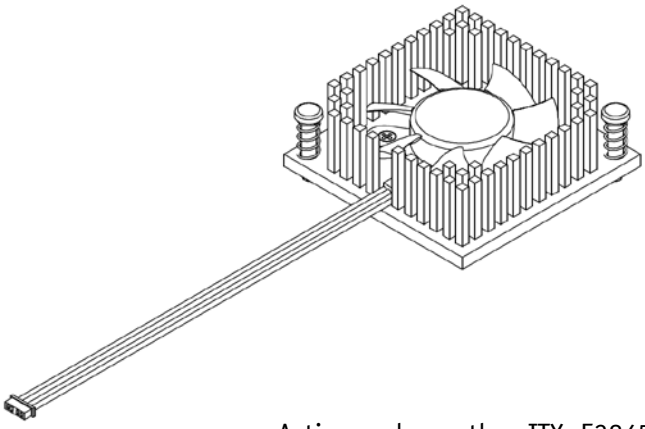
The block diagram below shows the architecture and main components of the mITX-E38. The key component on the board is the Intel® Atom E38xx SOC (Bay Trail).



3.3 Integrated Premounted Cooler



Passive cooler on the mITX-E3815/E3826



Active cooler on the pITX- E3845

3.4 System Memory Support

The mITX-E38 has 1x DDR3L SODIMM 204 pin socket supporting single-channel unbuffered DDR3L 1066/1333MHz (PC3L-8500/10600). pITX-E3815/E3826 supports only DDR3-1066MHz. Up to 4GB (Intel specification) however Kontron has qualified 8GB. (ECC not supported).

Note: If using 32bit OS then less than 4GB in displayed in System Properties
(Shared Video Memory/PCI resources is subtracted, Windows 32b report 2.88GB free)

Kontron offers the following memory modules for support of the temperature range 0^0C to 60^0C:

P/N 1055-9939: 2GB DDR3L 1600 PC3L-12800
P/N 1055-9941: 4GB DDR3L 1600 PC3L-12800
P/N 1055-9942: 8GB DDR3L 1600 PC3L-12800

Kontron offers the following memory modules having extended temperature range -40^0C to 85^0C, even though mITX-E38 only supports 0^0C to 60^0C:

P/N 1055-9445: 1GB DDR3L 1600 PC3L-12800
P/N 1055-9446: 2GB DDR3L 1600 PC3L-12800
P/N 1055-9447: 4GB DDR3L 1600 PC3L-12800
P/N 1055-9448: 8GB DDR3L 1600 PC3L-12800

Note: Kontron has succesfully tested mITX-E38 in range -25^0C to 75^0C, but only 0^0C to 60^0C is guaranteed.

Memory modules have in general a much lower longevity than embedded motherboards, and therefor EOL of modules can be expected several times during lifetime of the motherboard. Kontron guarantees that the above P/N will be maintained so that EOL module will be replaced by other similar type of qualified module.

As a minimum it is recommend using Kontron memory modules for prototype system(s) in order to prove stability of the system and as for reference.

For volume production you might request to test and qualify other types of RAM. In order to qualify RAM it is recommend configuring 3 systems running RAM Stress Test program in heat chamber at 60^0C for a minimum of 24 hours.

3.5 Power Consumption

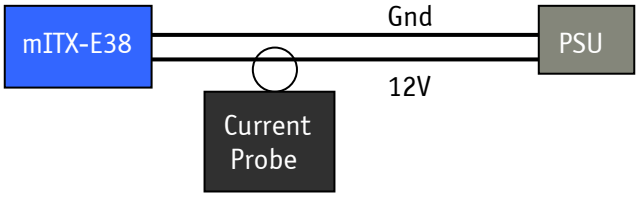
The following items were used in the test setup:

mITX-E38 Low Power Setup:
Standard system configuration equipped with Internal graphics, 1x SATA disks, Intel E3815CPU , 1x SODIMM (2GB Module), DP Monitor, PS2 Keyboard & Mouse,1x 16GB USB 3.0 Stick, Passive heat-sink, +12V PSU.

mITX-E38 High Power Setup:
Standard system configuration equipped with 1x PCI express LAN Card, mPCIE Wifi Card, 2x SATA disks, Intel E3845 CPU, 1x SODIMM (4GB Modules), DP Monitor, PS2 Keyboard & Mouse, 1x 16GB USB 3.0 Stick, 2x 16GB USB 2.0 Sticks, 12V active cooler, +12V PSU.

The principal test system and test equipment used

1. Fluke 289
2. Fluke 179
3. ATX rail switch Configured as 12V only



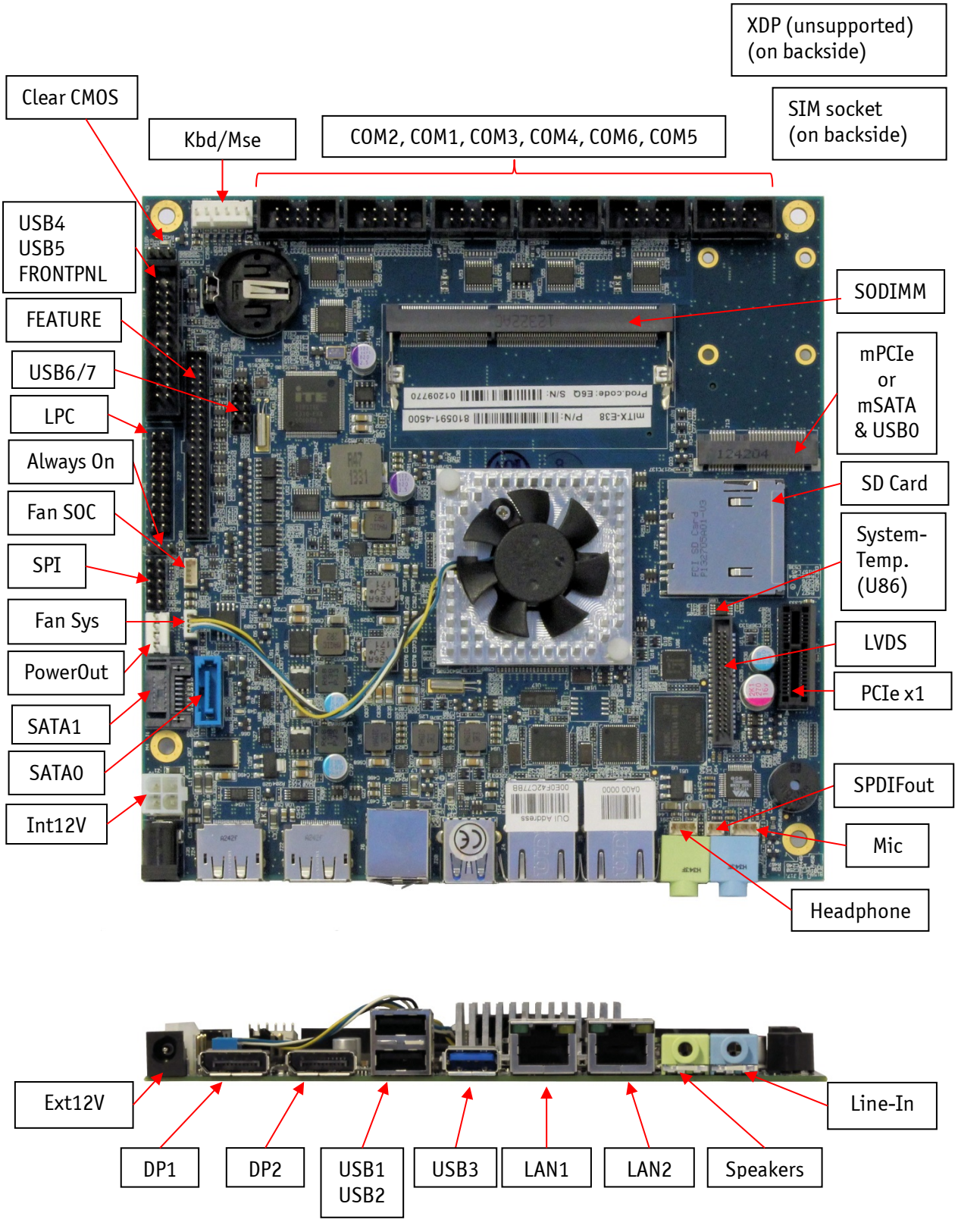
Note that power consumption of the Display and HDD are not included.

Power measurements:

Low Power Setup (E3815)	High Power Setup (E3845)
Windows 7 – Idle	
424mA – 5.20W	836mA – 10.22W
Windows 7 – 3DMark2006	
608mA – 7.46W	1214mA – 14.81W
Windows 7 – Intel TAT 100% all CPU cores and GFX	
487mA – 5.98W	1138mA – 13.87W
Windows 7 – S3 (Sleep)	
89mA – 1.13W	121mA – 1.54W
Windows 7 – S5 (Shutdown)	
72mA – 0.92W	101mA – 1.29W

4 Connector Locations

4.1 mITX-E38 – Frontside and Rear IO



5 Connector Definitions

The following sections provide pin definitions and detailed description of all on-board connectors.

The connector definitions follow the following notation:

Column name	Description
Pin	Shows the pin-numbers in the connector. The graphical layout of the connector definition tables is made similar to the physical connectors.
Signal	The mnemonic name of the signal at the current pin. The notation "XX#" states that the signal "XX" is active low.
Type	AI: Analogue Input. AO: Analogue Output. I: Input, TTL compatible if nothing else stated. IO: Input / Output. TTL compatible if nothing else stated. IOT: Bi-directional tristate IO pin. IS: Schmitt-trigger input, TTL compatible. IOC: Input / open-collector Output, TTL compatible. IOD: Input / Output, CMOS level Schmitt-triggered. (Open drain output) NC: Pin not connected. O: Output, TTL compatible. OC: Output, open-collector or open-drain, TTL compatible. OT: Output with tri-state capability, TTL compatible. LVDS: Low Voltage Differential Signal. PWR: Power supply or ground reference pins.
	Ioh: Typical current in mA flowing out of an output pin through a grounded load, while the output voltage is > 2.4 V DC (if nothing else stated). Iol: Typical current in mA flowing into an output pin from a VCC connected load, while the output voltage is < 0.4 V DC (if nothing else stated).
Pull U/D	On-board pull-up or pull-down resistors on input pins or open-collector output pins.
Note	Special remarks concerning the signal.

The abbreviation *TBD* is used for specifications which are not available yet or which are not sufficiently specified by the component vendors.

6 Rear IO Connectors

6.1 DC Power Jack Connector (Ext12V – J35)

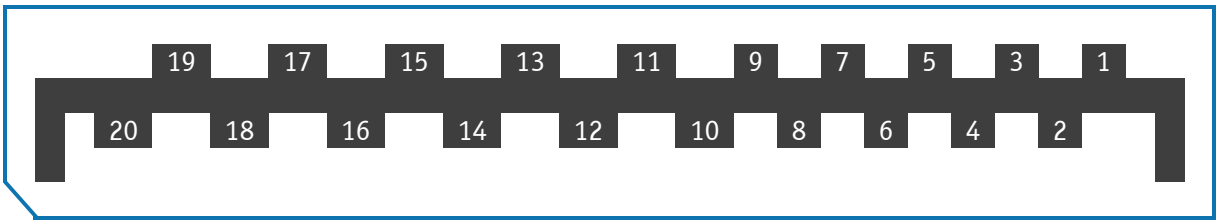
Either the DC Power Jack Connector (Ext12V) or the “Int12V.” connector must be used to supply the board with +12V +/-5%.

The Ext12V power connector has Vin to the center pin and mates with Ø 6.3 mm DC Power jack with Ø 2.0 mm pin hole. (DC Connector RA 2mm locking type). Maximum allowed current is 5A.

Warning: Hot Plugging power supply is not supported. Hot plugging might damage the board.

6.2 DP Connectors (DP1 – J24, DP2 – J22)

The DP (DisplayPort) connectors are based on standard DP type Foxconn 3VD51203-H7JJ-7H or similar.



Pin	Signal	Description	Type	Note
1	Lane 0 (p)		LVDS	
2	GND		PWR	
3	Lane 0 (n)		LVDS	
4	Lane 1 (p)		LVDS	
5	GND		PWR	
6	Lane 1 (n)		LVDS	
7	Lane 2 (p)		LVDS	
8	GND		PWR	
9	Lane 2 (n)		LVDS	
10	Lane 3 (p)		LVDS	
11	GND		PWR	
12	Lane 3 (n)		LVDS	
13	Config1	Aux or DDC selection	I	Internally pull down (1Mohm). Aux channel on pin 15/17 selected as default (when NC) DDC channel on pin 15/17, If HDMI adapter used (3.3V)
14	Config2	(Not used)	O	Internally connected to GND
15	Aux Ch (p)	Aux Channel (+) or DDC Clk		AUX (+) channel used by DP DDC Clk used by HDMI
16	GND		PWR	
17	Aux Ch (n)	Aux Channel (-) or DDC Data		AUX (-) channel used by DP DDC Data used by HDMI
18	Hot Plug		I	Internally pull down (100Kohm).
19	Return		PWR	Same as GND
20	3.3V		PWR	Fused by 1.5A resetable PTC fuse.

6.3 USB Connectors (IO Area)

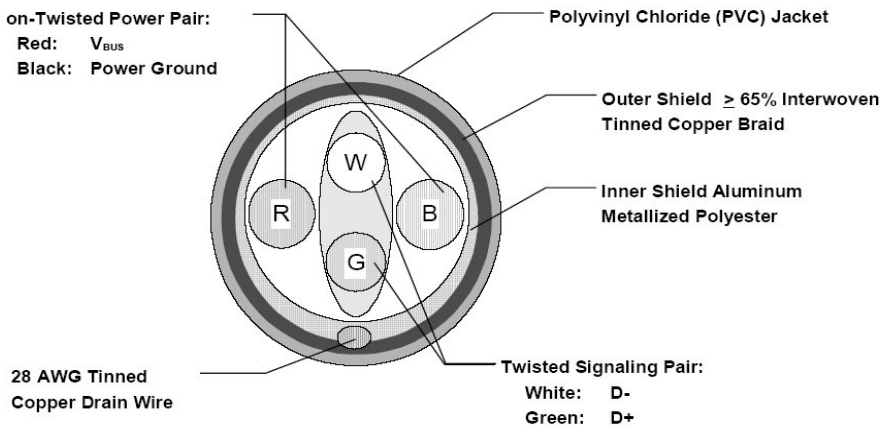
The mITX-E38 board contains support for one external USB3.0/2.0 port (USB3) and two external USB2.0 ports (USB1 and USB2). One USB2.0 port (USB0) is available via mPCIe slot.

On the E3845 four extra internal USB2.0 ports are available via internal pin connectors USB6/7 connector and Front Panel connector (USB4/5).

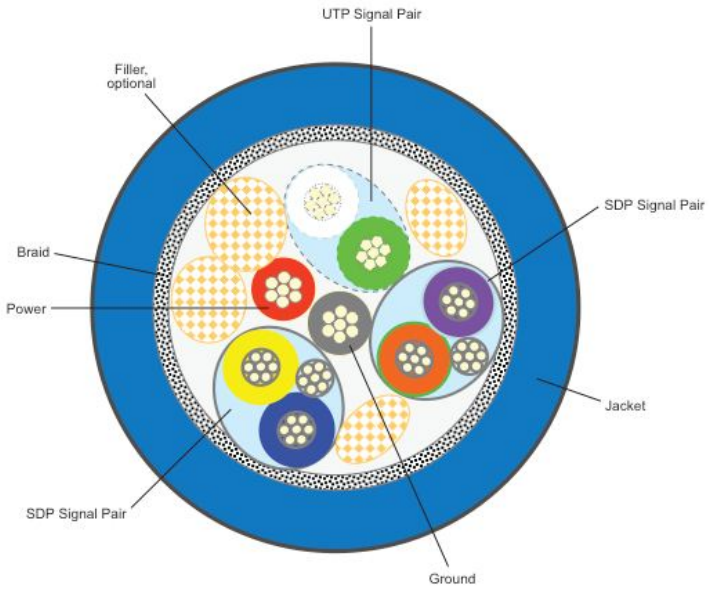
USB 2.0 ports allowing data transfers up to 480Mb/s. The USB 3.0 port allowing data transfers up to 5Gb/s.

Legacy Keyboard/Mouse and wakeup from sleep states are supported. Over-current detection on all USB ports is supported. The following USB connectors are available in the IO Area.

For USB2.0 cabling it is required to use only HiSpeed USB cable, specified in USB2.0 standard:



For USB3.0 cabling it is required to use only HiSpeed USB cable, specified in USB3.0 standard:



Note that in order to meet the requirements of USB standard, the 5V input supply must be at least 5.00V.

USB Connector 1/2 (USB1 / USB2 – J6)

USB Ports 1 and 2 supports up to USB2.0.

Note	Type	Signal	PIN	Signal	Type	Note
	PWR	5V	1 2 3 4	GND	PWR	
	DSIO-3.3	USB1-		USB1+	DSIO-3.3	
	PWR	5V	1 2 3 4	GND	PWR	
	DSIO-3.3	USB2-		USB2+	DSIO-3.3	

Signal	Description
USBn+ USBn- RXn+ RXn- TXn+ TXn- (n= 1,2)	Differential pair works as serial differential receive/transmit data lines.
5V	5V supply for external devices. Protected by 1.0A current limiting circuit.

USB Connector 3 (USB3 – J20)

USB Ports 3 support USB3.0/USB2.0.

Note	Type	Signal	PIN	Signal	Type	Note
	IO	USB3-		USB3+	IO	
	PWR	5V	1 2 3 4	GND	PWR	
	IO	RX3-	5 6 7 8 9	TX3+	IO	
	IO	RX3+		TX3-	IO	

Signal	Description
USB3+ USB3- RX3+ RX3- TX3+ TX3-	Differential pair works as serial differential receive/transmit data lines.
5V	5V supply for external devices. Protected by 1.0A current limiting circuit.

6.4 Ethernet Connectors (LAN1 – J4 and LAN2 – J5)

Two channels of 10/100/1000Mb Ethernet based on Intel® Pearsonville i211AT PCI Express controllers are available.

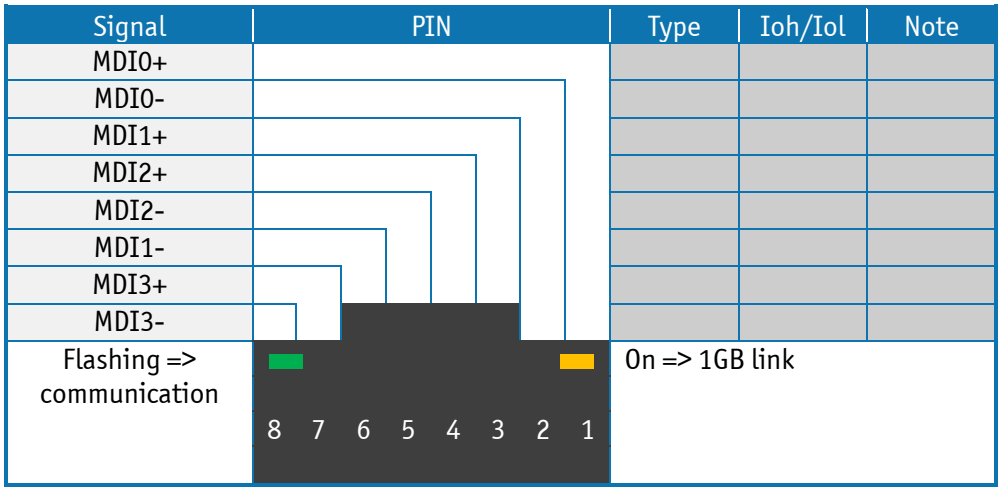
In order to achieve the specified performance of the Ethernet port, Category 5 twisted pair cables must be used with 10/100MB and Category 5E, 6 or 6E with 1Gb LAN networks.

The signals for the Ethernet ports are as follows:

Signal	Description
MDI[0]+ / MDI[0]-	In MDI mode, this is the first pair in 1000Base-T, i.e. the BI_DA+/- pair, and is the transmit pair in 10Base-T and 100Base-TX. In MDI crossover mode, this pair acts as the BI_DB+/- pair, and is the receive pair in 10Base-T and 100Base-TX.
MDI[1]+ / MDI[1]-	In MDI mode, this is the second pair in 1000Base-T, i.e. the BI_DB+/- pair, and is the receive pair in 10Base-T and 100Base-TX. In MDI crossover mode, this pair acts as the BI_DA+/- pair, and is the transmit pair in 10Base-T and 100Base-TX.
MDI[2]+ / MDI[2]-	In MDI mode, this is the third pair in 1000Base-T, i.e. the BI_DC+/- pair. In MDI crossover mode, this pair acts as the BI_DD+/- pair.
MDI[3]+ / MDI[3]-	In MDI mode, this is the fourth pair in 1000Base-T, i.e. the BI_DD+/- pair. In MDI crossover mode, this pair acts as the BI_DC+/- pair.

Note: MDI = Media Dependent Interface.

The pinout of the RJ45 connectors is as follows:



6.5 Audio Jack Connectors (Speakers – J2, Line-In –J23)

The on-board Audio circuit, based on VT1708S having UAA (Universal Audio Architecture) and featuring five 24-bit stereo DACs and three 20-bit stereo ADCs, implements up to 8 Channel High Definition Audio via two audiojack connectors located in the Rear IO area, the internal Feature pin-row connector, internal MIC1 pin-row connector, internal Headphone pin-row connector and via SPDIF.

Only the two audiojack connectors are described in the following.

This lime colored jack connector can be used for stereo speakers/headphones and the signals are shared with internal Headphone 4-pin-row connector located behind the jack connector.

	Signal	Type	Note
TIP	LINE-OUT-L	OA	
RING	LINE-OUT-R	OA	
SLEEVE	GND	PWR	

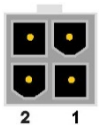
This blue colored jack connector can be used for stereo Line-In signals.

	Signal	Type	Note
TIP	LINE1-IN-L	IA	
RING	LINE1-IN-R	IA	
SLEEVE	GND	PWR	

7 Internal Connectors

7.1 DC Power Internal Connector (Int12V – J7)

The mITX-E38 has an internal power input connector for supplying voltage in the range from +11.4V to +12.6V. The power connector is a 4 pin 12V ATX connector type Lotes ABA-POW-003-K02 or similar.

Header	Pin	Signal	Description
	1	GND	Ground
	2	GND	Ground
	3	12V	Power supply +12V
	4	12V	Power supply +12V

Warning: Hot Plugging power supply is not supported. Hot plugging might damage the board.

Notes: ***To protect the external power lines of peripheral devices make sure that***
- the wires have the right diameter to withstand the maximum available current.
- to enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

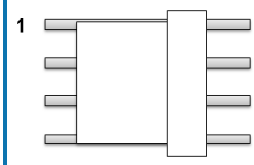
Alternatively the DC Power External Connector can be used

Available cable kit:

PN 1052-5814 Cable ATX Power for KTA70M, 200mm long.

7.2 Power Out Connector (PowerOut - J32)

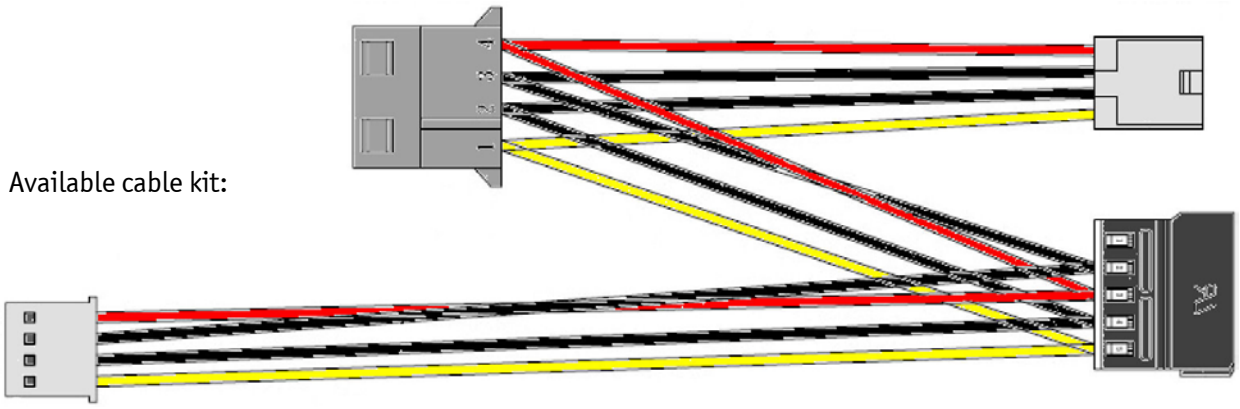
The Power Out connector can be used to power source external devices like HDD. The connector is type Molex 22-23-2041 or similar.

Header	Pin	Signal	Description	Type
	1	5V	Power +5V	PWR
	2	GND	Ground	PWR
	3	GND	Ground	PWR
	4	12V	Power +12V	PWR

Warning: Hot Plugging power supply is not supported. Hot plugging might damage the board.

Notes: ***To protect the external power lines of peripheral devices make sure that***
- the wires have the right diameter to withstand the maximum available current.
- to enclosure of the peripheral device fulfills the fire-protecting conditions of IEC/EN 60950.

Available cable kit:



PN 1027-3669 Cable Power Out

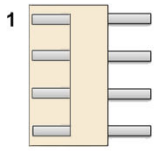
7.3 Internal Audio Connectors

The on-board Audio circuit implements 7.1+2 Channel High Definition Audio with UAA (Universal Audio Architecture), featuring five 24-bit stereo DACs and three 20-bit stereo ADCs.

The following Audio connectors are available as internal connectors.

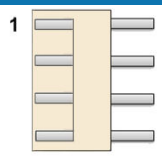
Headphone Connector (Headphone – J34)

This connector can be used for stereo speakers/headphones. The signals are shared with the lime colored jack connector.

Header	Pin	Signal	Description	Type
	1	GND	Ground	PWR
	2	Speaker Left		AO
	3	GND	Ground	PWR
	4	Speaker Right		AO

Mic Connector (MIC – J17)

This connector can be used for stereo microphones.

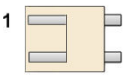
Header	Pin	Signal	Description	Type
	1	GND	Ground	PWR
	2	Microphone Left		AI
	3	GND	Ground	PWR
	4	Microphone Right		AI

SPDIF Connector (SPDIFout – J33)

The digital audio interface (electrical SPDIF-Out) is available through 2-pin connector and can be used to implement 8 (7.1) Channel High Definition Audio.

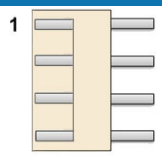
Circuit is based on high fidelity 8-channel HD audio codec which is compatible with Intel HD Audio specification and supports stereo 24-bit resolution and up to 192 kHz sample rate for DACs/ADCs.
Up to 90 dB Signal-to-Noise Ratio (SNR).

16/20/24-bit S/PDIF TX Outputs supporting 48K/96K/44.1K/88.2 KHz sample rate

Header	Pin	Signal	Description	Type
	1	SPDIF-OUT		IO
	2	GND		PWR

7.4 Fan for SOC and System (Fan SOC – J29, Fan Sys – J28)

The Fan SOC is used for the connection of the FAN included in active SOC cooler.
The Fan Sys can be used to power, control and monitor fan for chassis ventilation etc.

Header	Pin	Signal	Description	Type
	1	GND	Ground	PWR
	2	12V		AI
	3	TACHO	Tacho signal	I
	4	PWM	PWM output	O-3.3

Signal	Description
PWM	PWM output signal for FAN speed control.
TACHO	Tacho input signal from the fan, for rotation speed supervision RPM (Rotation Per Minute). The signal shall be generated by an open collector transistor or similar. Onboard is a pull-up resistor 4K7 to +12V. The signal has to be pulsed and onboard circuit is prepared for two pulses per rotation.
12V	+12V supply for fan. A maximum of 500mA can be supplied from this pin.
GND	Power Supply GND signal

7.5 PS/2 Keyboard and Mouse connector (KBD/MSE) (J26)

Attachment of a PS/2 keyboard/mouse can be done through the pinrow connector KBD/MSE. Both interfaces utilize open-drain signalling with on-board pull-up.

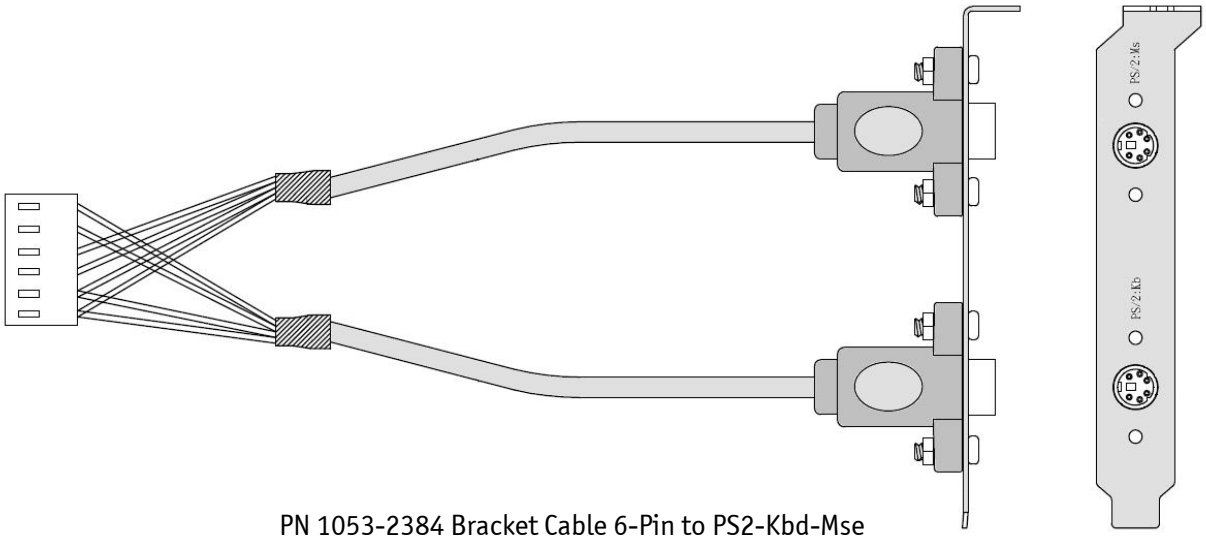
The PS/2 mouse and keyboard is supplied from 5V when in standby mode in order to enable keyboard or mouse activity to bring the system out from power saving states. The supply is provided through a 1.1A resettable fuse.

PIN	Signal	Type	Ioh/Iol	Pull U/D	Note
1	KBDCLK	IOD	/14mA	2K7	
2	KBDDAT	IOD	/14mA	2K7	
3	MSCLK	IOD	/14mA	2K7	
4	MSDAT	IOD	/14mA	2K7	
5	5V	PWR	-	-	
6	GND	PWR	-	-	

Signal Description – Keyboard & and mouse Connector (KBDMSE).

Signal	Description
MSCLK	Bi-directional clock signal used to strobe data/commands from/to the PS/2 mouse.
MSDAT	Bi-directional serial data line used to transfer data from or commands to the PS/2 mouse.
KDBCLK	Bi-directional clock signal used to strobe data/commands from/to the PC-AT keyboard.
KBDDAT	Bi-directional serial data line used to transfer data from or commands to the PC-AT keyboard.

Available cable kit:



PN 1053-2384 Bracket Cable 6-Pin to PS2-Kbd-Mse

7.6 LVDS Flat Panel Connector (LVDS – J31)

The LVDS connector is based on 40 pole connector type Samtec SHF-120-01-F-D-SM-K-TR or similar.

Note	Type	Signal	PIN		Signal	Type	Note
Max. 0.5A	PWR	+12V	1	2	+12V	PWR	Max. 0.5A
Max. 0.5A	PWR	+12V	3	4	+12V	PWR	Max. 0.5A
Max. 0.5A	PWR	+12V	5	6	GND	PWR	Max. 0.5A
Max. 0.5A	PWR	+5V	7	8	GND	PWR	Max. 0.5A
Max. 0.5A	PWR	LCDVCC	9	10	LCDVCC	PWR	Max. 0.5A
2K2Ω, 3.3V	OT	DDC CLK	11	12	DDC DATA	OT	2K2Ω, 3.3V
3.3V level	OT	BKLTCTL	13	14	VDD ENABLE	OT	3.3V level
3.3V level	OT	BKLTEN#	15	16	GND	PWR	Max. 0.5A
	LVDS	LVDS A0-	17	18	LVDS A0+	LVDS	
	LVDS	LVDS A1-	19	20	LVDS A1+	LVDS	
	LVDS	LVDS A2-	21	22	LVDS A2+	LVDS	
	LVDS	LVDS ACLK-	23	24	LVDS ACLK+	LVDS	
	LVDS	LVDS A3-	25	26	LVDS A3+	LVDS	
Max. 0.5A	PWR	GND	27	28	GND	PWR	Max. 0.5A
	LVDS	LVDS B0-	29	30	LVDS B0+	LVDS	
	LVDS	LVDS B1-	31	32	LVDS B1+	LVDS	
	LVDS	LVDS B2-	33	34	LVDS B2+	LVDS	
	LVDS	LVDS BCLK-	35	36	LVDS BCLK+	LVDS	
	LVDS	LVDS B3-	37	38	LVDS B3+	LVDS	
Max. 0.5A	PWR	GND	39	40	GND	PWR	Max. 0.5A

Note: The LVDS connector supports single and dual channel, 18/24bit SPWG panels up to a resolution of 1600x1200 or 1920x1080 and with limited frame rate up to 1920x1200.

Signal Description – LVDS Flat Panel Connector:

Signal	Description
LVDS A0..A3	LVDS A Channel data
LVDS ACLK	LVDS A Channel clock
LVDS B0..B3	LVDS B Channel data
LVDS BCLK	LVDS B Channel clock
BKLTCTL	Backlight control (1), PWM signal to implement voltage in the range 0-3.3V
BKLTEN#	Backlight Enable signal (active low) (2)
VDD ENABLE	Output Display Enable.
LCDVCC	VCC supply to the display. 5V or 3.3V (1A Max.) selected in BIOS setup menu. Power sequencing depends on LVDS panel selection. (Shared with eDP connector)
DDC CLK	DDC Channel Clock

Notes: Windows API will be available to operate the BKLTCTL signal. Some Inverters have a limited voltage range 0- 2.5V for this signal: If voltage is > 2.5V the Inverter might latch up. Some Inverters generates noise on the BKLTCTL signal, causing the LVDS transmission to fail (corrupted picture on the display). By adding a 1Kohm resistor in series with this signal, mounted at the Inverter end of the cable kit, the noise is limited and the picture is stable.
If the Backlight Enable is required to be active high then, check the following BIOS Chipset setting: Backlight Signal Inversion = Enabled.

7.7 SATA (Serial ATA) Disk interface (SATA0 – J15, SATA1 – J1)

The two SATA ports available on the mITX-E38 supports SATA Gen2 (3.0/1.5Gb/s).

Notes: RAID is not supported. SATA1 shared with mSATA, so that if mSATA is installed then the SATA1 is disabled.

Sata connector pinning: SATA0 and SATA1

PIN	Signal	Type	Ioh/Iol	Note
1	GND	PWR	-	
2	SATA* TX+			
3	SATA* TX-			
4	GND	PWR	-	
5	SATA* RX-			
6	SATA* RX+			
7	GND	PWR	-	

Signal	Description
SATA* RX+ / RX-	Host transmitter differential signal pair
SATA* TX+ / TX-	Host receiver differential signal pair

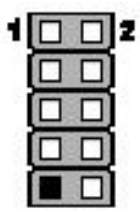
"*" specifies 0, 1 depending on SATA port.

Available cable kit:

PN 821035 Cable SATA 500mm

7.8 Internal USB Connectors (USB6/7 – J21)

USB Port 6 and 7 are supplied on the internal 10-pin- row connector USB6/7. Only available at E3845.

Header	Pin	Signal	Description	Type
	1	USB6_5V	5V protected by separate 1A resettable fuse	PWR
	2	USB7_5V	5V protected by separate 1A resettable fuse	PWR
	3	USB6-	Differential pair 6 -	DSIO-3.3
	4	USB7-	Differential pair 7 -	DSIO-3.3
	5	USB6+	Differential pair 6 +	DSIO-3.3
	6	USB7+	Differential pair 7 +	DSIO-3.3
	7	GND	Ground	PWR
	8	GND	Ground	PWR
	-	-	(pin not mounted -Used for keying)	
	10	-		NC

Signal	Description
USB6+ USB6-	Differential pair works as Data/Address/Command Bus.
USB7+ USB7-	Differential pair works as Data/Address/Command Bus.
USB6_5V USB7_5V	5V supply for external devices. Protected by 1.0A current limiting circuit.

In order to meet the requirements of USB standard, the 5V input supply must be at least 5.00V.

7.9 Serial COM Ports (COM1-6, J19, J18, J37, J38, J10, J9)

Six RS232 serial ports are available via 10-pin-row connectors.

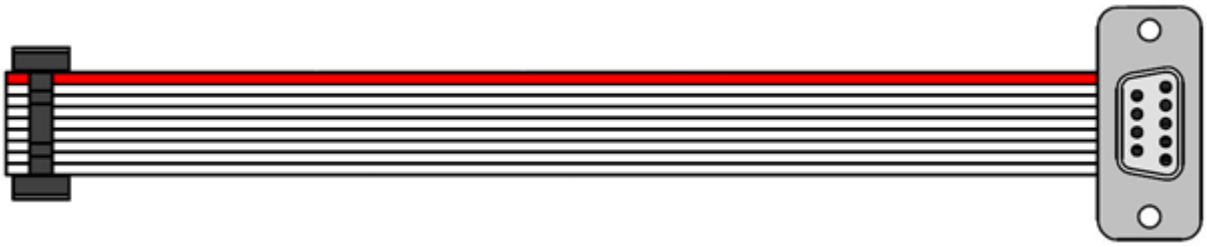
Note	Ioh/Iol	Type	Signal	PIN	Signal	Type	Ioh/Iol	Note
	-	I	DCD	1 2	DSR	I	-	
	-	I	RxD	3 4	RTS	O		
		O	TxD	5 6	CTS	I	-	
		O	DTR	7 8	RI	I	-	
	-	PWR	GND	9 10	5V	PWR	-	1

The typical definition of the signals in the COM ports is as follows:

Signal	Description
TxD	Transmitted Data, sends data to the communications link. The signal is set to the marking state (-12V) on hardware reset when the transmitter is empty or when loop mode operation is initiated.
RxD	Received Data, receives data from the communications link.
DTR	Data Terminal Ready, indicates to the modem etc. that the on-board UART is ready to establish a communication link.
DSR	Data Set Ready, indicates that the modem etc. is ready to establish a communications link.
RTS	Request To Send, indicates to the modem etc. that the on-board UART is ready to exchange data.
CTS	Clear To Send, indicates that the modem or data set is ready to exchange data.
DCD	Data Carrier Detect, indicates that the modem or data set has detected the data carrier.
RI	Ring Indicator, indicates that the modem has received a ringing signal from the telephone line.

Note 1: The COM1/COM2 5V supply is fused with common 1.5A resettable fuse and similar for COM3/COM4 and COM5/COM6.

Available cable kit DB9 adapter cables are available for implementing standard COM ports on chassis.



PN 821017 - 100 mm or PN 821016 - 200 mm

7.10 Front Panel Connector (FRONTPNL - J12)

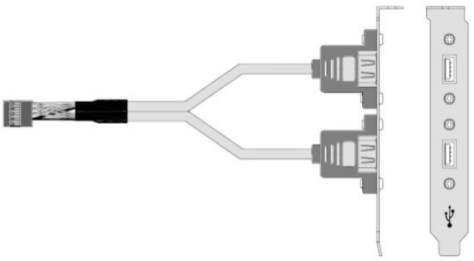
Note	Pull U/D	Ioh/ Iol	Type	Signal	PIN		Signal	Type	Ioh/ Iol	Pull U/D	Note
	-	-	PWR	USB4_5V	1	2	USB5_5V	PWR	-	-	
	-	-		USB4-	3	4	USB5-		-	-	
	-	-		USB4+	5	6	USB5+		-	-	
	-	-	PWR	GND	7	8	GND	PWR	-	-	
	-	-	NC	NC	9	10	Headphone-L		-	-	
	-	-	PWR	5V	11	12	5V	PWR	-	-	
	-	25/25mA	O	SATA_LED#	13	14	SUS_LED	O	7mA	-	
	-	-	PWR	GND	15	16	PWRBTN_IN#	I		1K1	
	4K7	-	I	RSTIN#	17	18	GND	PWR	-	-	
	-	-	PWR	3V3	19	20	Headphone-R		-	-	
	-	-	PWR	AGND	21	22	AGND	PWR	-	-	
	-	-	AI	MIC2-L	23	24	MIC2-R	AI	-	-	

Note: USB4 and USB5 only available at E3845.

Signal	Description
USB4_5V USB5_5V	5V supply for external devices. Protected by 1.0A current limiting circuit for each USB port.
USB4+/USB4-	Universal Serial Bus Port 4 Differentials: Bus Data/Address/Command Bus.
USB5+/USB5-	Universal Serial Bus Port 5 Differentials: Bus Data/Address/Command Bus.
5V	+5V power. Maximum load is 1A or 2A per pin if using IDC connector flat cable or crimp terminals respectively.
SATA_LED#	SATA Activity LED (active low signal). 3V3 output when passive.
SUS_LED	Suspend Mode LED (active high signal). Output 3.3V via 470Ω.
PWRBTN_IN#	Power Button In. Toggle this signal low to start the ATX / BTX PSU and boot the board.
RSTIN#	Reset Input. When pulled low for a minimum 16ms, the reset process will be initiated. The reset process continues even though the Reset Input is kept low.
Headphone	Headphone stereo signals (different audio stereo channel than Front Speaker signals).
MIC2	MIC2 is second stereo microphone input.
3V3	+3.3V power. Maximum load is 1A or 2A per pin if using IDC connector flat cable or crimp terminals respectively.
AGND	Analogue Ground for Audio.

Available cable kits:

PN 821042 Cable Front Panel Open-End, 300 mm



PN 821401 Bracket Dual USB Cable

7.11 Feature Connector (Feature – J27)

Note	Pull U/D	Ioh/Iol	Type	Signal	PIN		Signal	Type	Ioh/Iol	Pull U/D	Note
	-	-	NC	-	1	2	SMBCLK		/4mA	10K/	1
	-	25/25mA	O	S5#	3	4	SMBDAT		/4mA	10K/	1
	-	25/25mA	O	PWR_OK	5	6	EXT_BAT	PWR	-	-	
	-	-	NC	-	7	8	-	NC	-	-	
	-	-	PWR	SB3V3	9	10	SB5V	PWR	-	-	
	-		IOT	GPIO0	11	12	GPIO1	IOT		-	
	-		IOT	GPIO2	13	14	GPIO3	IOT		-	
	-		IOT	GPIO4	15	16	GPIO5	IOT		-	
	-		IOT	GPIO6	17	18	GPIO7	IOT		-	
	-	-	PWR	GND	19	20	GND	PWR	-	-	
	-		I	GPIO8	21	22	GPIO9	I		-	
	-		I	GPIO10	23	24	GPIO11	I		-	
	-		I	GPIO12	25	26	GPIO13	IOT		-	
	-		IOT	GPIO14	27	28	GPIO15	IOT		-	
	-		IOT	GPIO16	29	30	GPIO17	IOT		-	
	-	-	PWR	GND	31	32	GND	PWR	-	-	
	-	8/8mA	O	EGCLK	33	34	EGCS#	O	8/8mA	-	
	-	8/8mA		EGAD	35	36	TMA0	O			
	-		PWR	+12V	37	38	GND	PWR	-	-	
	-	-	NC	-	39	40	-	NC	-	-	
	-	-	PWR	GND	41	42	GND	PWR	-	-	
	-	-	PWR	GND	43	44	S3#	O	25/25mA	-	

Notes: 1. Pull-up to +3V3Dual (+3V3 or SB3V3). **2.** Pull-up to on-board Battery. **3.** Pull-up to +3V3.

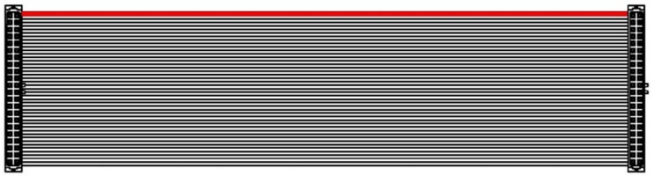
Signal	Description
SMBCLK	SMBus Clock signal
SMBDAT	SMBus Data signal
S3#	S3 sleep mode, active low output, optionally used to deactivate external system.
S5#	S5 sleep mode, active low output, optionally used to deactivate external system.
PWR_OK	PoWeR OK, signal is high if no power failures are detected. (This is not the same as the P_OK signal generated by ATX PSU).
EXT_BAT	(EXTernal BATtery) option for connecting + terminal of an external primary cell battery (2.5 - 3.47 V) (– terminal connected to GND). The external battery is protected against charging and can be used with/without the on-board battery installed.
3V3	Max. load is 0.75A (1.5A < 1 sec.)
5V	+5V supply.
GPIO0..17	General Purpose Inputs / Output. These Signals may be controlled or monitored through the use of the KT-API-V2 (Application Programming Interface).
EGCLK	Extend GPIO Clock signal
EGAD	Extend GPIO Address Data signal
EGCS#	Extend GPIO Chip Select signal, active low
TMA0	Timer Output
+12V	Max. load is 0.75A (1.5A < 1 sec.)

The GPIO's are controlled via the ITE IT8516F Embedded Controller. Each GPIO has 100pF to ground, clamping Diode to 3V3 and has multiplexed functionality. Some pins can be DAC (Digital to Analogue Converter output), PWM (Pulse Width Modulated signal output), ADC (Analogue to Digital Converter input), TMRI (Timer Counter Input), WUI (Wake Up Input), RI (Ring Indicator Input) or some special function.

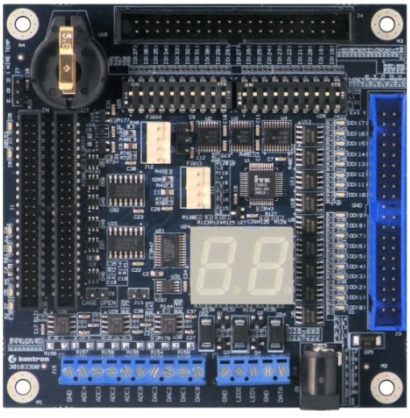
Signal	IT8516F pin name	Type	Description
GPIO0	DAC0/GPJ0	AO/IOS	
GPIO1	DAC1/GPJ1	AO/IOS	
GPIO2	DAC2/GPJ2	AO/IOS	
GPIO3	DAC3/GPJ3	AO/IOS	
GPIO4	PWM2/GPA2	O8/IOS	
GPIO5	PWM3/GPA3	O8/IOS	
GPIO6	PWM4/GPA4	O8/IOS	
GPIO7	PWM5/GPA5	O8/IOS	
GPIO8	ADC0/GPI0	AI/IS	
GPIO9	ADC1/GPI1	AI/IS	
GPIO10	ADC2/GPI2	AI/IS	
GPIO11	ADC3/GPI3	AI/IS	
GPIO12	ADC4/WUI28/GPI4	AI/IS/IS	
GPIO13	RI1#/WUI0/GPD0	IS/IS/IOS	
GPIO14	RI2#/WUI1/GPD1	IS/IS/IOS	
GPIO15	TMRI0/WUI2/GPC4	IS/IS/IOS	
GPIO16	TMRI1/WUI3/GPC6	IS/IS/IOS	
GPIO17	L80HLAT/BAO/WUI24/GPE0	O4/O4/IS/IOS	

AO = Analogue Output
IOS = Digital Input or Output 4, 8, 12 or 16 mA, Open-Drain option.
O4 = Output 4mA
O8 = Output 8mA
AI = Analogue Input
IS = Digital Input

Available cable kit and Break-Out-Board:



PN 1052-5885 Cable, Feature 44pol 1 to1, 300mm

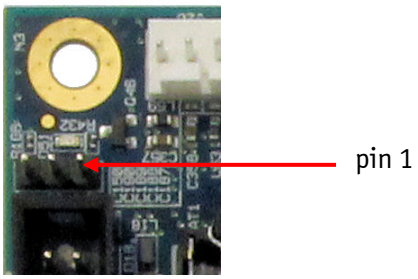


PN 820978 Feature BOB (Break-Out-Board)

Note, the FAN3, FAN4 and OpenCASE# features on the BOB are not supported by the mITX-E38.

7.12 Clear CMOS Settings" (Clear CMOS – J3)

The Jumper has 3 positions: Pin 1-2, Pin2-3 (default position) and not mounted.



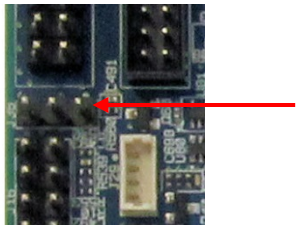
Warning Don't leave the jumper in position 1-2, otherwise if power is disconnected, the battery will fully deplete within a few weeks.

CMOS1		Description
pin1-2	pin2-3	
X	-	Clear CMOS settings exclusive erasing Password
-	X	Default position
-	-	No function. Note: may load default BIOS settings after several minutes

7.13 Always On connector (Always On - J36)

The “Always On” can be used to implement hardware controlled Always ON by jumper. When “Always On” is selected, then the board will power up automatically when power is connected. It doesn’t matter if “Always On” is not selected in BIOS.

The board can still be shut down by PWRBTN_IN# (power button in) activation (via Front Panel connector).



Always On		Description
pin1-2	pin2-3	
X	-	Always On selection
-	X	Default position
-	-	No function. Note: may load default BIOS settings after several minutes

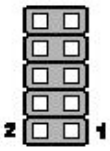
7.14 SPI Connector (SPI – J16)

The mITX-E38 provides one synchronous full duplex SPI (Serial Peripheral Interface) Bus in a 10 pin header connector. The connector is type Pinrex 512-90-10GBE5 or similar.

Two things should be considered:

1. An onboard SPI™ flash coexists on the same interface lines. You must disable this component with a 3.3V power connection to the ADDIN signal (e.g. a short circuit jumper between pin 2 and 4).

2. The four SPI™ lines are protected with an additional bus driver and the ISOLATE# signal controls the output enable pin. For normal operation this signal should be high.

Header	Pin	Signal	Description	Type
(Always On)  (Fan Sys)	1	SPI_CLK	SPI clock	O-3.3
	2	3.3V	Power +3.3V	PWR
	3	SPI_CS#	SPI slave select, active low	O-3.3
	4	ADDIN	Disable onboard SPI flash	I-3.3
	5	RSVD	Reserved (10k pullup to 3.3V)	PWR
	6	N.C.	Not connected	NC
	7	SPI_MOSI	SPI master output, Slave Input	IO-3.3
	8	ISOLATE#	Disable the SPI interface	I-3.3
	9	SPI_MISO	SPI master input, Slave Output	IO-3.3
	10	GND	Ground	PWR

Signal	Description
SPI_CLK	Serial Clock
3.3V	3.3V Standby Voltage power line. Normally output power, but when Motherboard is turned off then the on-board SPI Flash can be 3.3V power sourced via this pin.
SPI_CS#	CS# Chip Select, active low.
ADDIN	ADDIN input signal must be NC.
SPI_MOSI	Master Output, Slave Input.
ISOLATE#	The ISOLATE# input, active low, is normally NC, but must be connected to GND when programming the SPI flash. Power Supply to the Motherboard must be turned off when loading SPI flash. The pull up resistor is connected via diode to 5VSB.
SPI_MISO	Master Input, Slave Output
SPI_IO2_#WP	SPI Data I/O: A bidirectional signal used to support Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. The signal is not used in Dual Output Fast Read mode.
SPI_IO3_#HOLD	SPI Data I/O: A bidirectional signal used to support Dual IO Fast Read, Quad IO Fast Read and Quad Output Fast Read modes. The signal is not used in Dual Output Fast Read mode.

7.15 LPC Connector (LPC - J30)

The LPC connector is in general unsupported (application wise). Only under special circumstances where the LPC interface is a must it will be possible by the customer to use this connector. Please notice that incorrect use of the interface may course system instability.

Note	Pull U/D	Ioh/Iol	Type	Signal	PIN		Signal	Type	Ioh/Iol	Pull U/D	Note
	-	-	PWR	LPC CLK	1	2	GND				
	-	-	PWR	LPC FRAME#	3		KEY				
				LPC RST#	5	6	+5V				
				LPC AD3	7	8	LPC AD2				
				+3V3	9	10	LPC AD1				
				LPC AD0	11	12	GND				
				SMB_CLK	13	14	SMB_DATA				
				SB3V3	15	16	LPC SERIRQ				
				GND	17	18	CLKRUN#				
				SUS_STAT#	19	20	TPM_DRQ#0				

7.16 XDP Debug Port (XDP – J40)

The XDP-CPU (Intel Debug Port for CPU) connector is not mounted and not supported. XDP connector layout (pads) is located on the backside of PCB and is prepared for the Molex 52435-2671 (or 52435-2672).

Pin	Signal	Description	Type	Pull Up/Down	Note
1	OBSFN_A0			220R to 1,8V	
2	OBSFN_A1				
3	GND		PWR	-	
4	NC		NC	-	
5	NC		NC	-	
6	GND		PWR	-	
7	NC		NC	-	
8	NC		NC	-	
9	GND		PWR	-	
10	HOOK0	PMC_RSMRST#			
11	HOOK1	PWRBTN#			
12	HOOK2	PMC_CORE_PWROK			
13	HOOK3	XDP_RTEST#			
14	HOOK4		NC		
15	HOOK5		NC		
16	+1,8V		PWR	-	
17	HOOK6	PLTRST#			
18	HOOK7	1,8V_SYS_RESET#			
19	GND		PWR	-	
20	TDO			50R to 1,8V	
21	TRST#			/50R	
22	TDI			50R to 1,8V	
23	TMS			50R to 1,8V	
24	NC		NC	-	
25	GND		PWR	-	
26	TCK0			/50R	

8 Slot Connectors

The mITX-E38 has support for PCIex1, SD Card, mPCIe or mSATA inclusive USB2.0 and SIM support

8.1 PCI-Express x1 Connector (PCIex1 – J8)

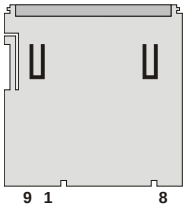
The **PCIex1** can be used for external PCI Express cards inclusive graphics card. Maximum theoretical bandwidth is 4 Gbps effectively for each direction, 8 Gbps in total.

Note	Type	Signal	PIN#		Signal	Type	Note
		+12V	B1	A1	NC		
		+12V	B2	A2	+12V		
		+12V	B3	A3	+12V		
		GND	B4	A4	GND		
		SMB_CLK	B5	A5	NC		
		SMB_DATA	B6	A6	NC		
		GND	B7	A7	NC		
		+3V3	B8	A8	NC		
		NC	B9	A9	+3V3		
		SB3V3	B10	A10	+3V3		
		WAKE#	B11	A11	RST#		
		NC	B12	A12	GND		
		GND	B13	A13	PCIE CLK		
		PCIE_TXP	B14	A14	PCIE CLK#		
		PCIE_TXN	B15	A15	GND		
		GND	B16	A16	PCIE_RXP		
		NC	B17	A17	PCIE_RXN		
		GND	B18	A18	GND		

8.2 SD card slot (SD Card – J25)

SD Card 3.0 interface.

- Up to 832Mbits per second data rate using up to 4 parallel data lines.
- Transfers the data in following UHS-I modes: HS and DDR50.
- Cyclic Redundancy Check CRC7 for command and CRC16 for data integrity.
- Designed to work with I/O cards, Read-only cards and Read/Write cards.
- Supports Read wait Control. SDIO only validated with WIFI devices.

Header	Pin	Signal	Description	Type
	1	CD / DATA3	Card detect / Data bit 3	IO-3.3
	2	CMD	Command line	IO-3.3
	3	GND	Ground	PWR
	4	VCC3	Power +3.3V	PWR
	5	CLK	Clock	O-3.3
	6	GND	Ground	PWR
	7	DATA0	Data bit 0	IO-3.3
	8	DATA1	Data bit 1	IO-3.3
	9	DATA2	Data bit 2	IO-3.3
	10	CD#	Card Detection on low	I
	11	WP	Write Protect	I

8.3 mPCIe/mSATA connector (mPCIe or mSATA & USB – J13)

The mPCIe/mSATA connector supports mSATA or PCIe and USB 2.0 (USB0) and SIM socket cards. The mSATA port is shared with SATA1.

Note	Type	Signal	PIN		Signal	Type	Note
		WAKE#	1	2	+3V3	PWR	
	NC	NC	3	4	GND	PWR	
	NC	NC	5	6	+1.5V	PWR	
1		CLKREQ#	7	8	UIM_PWR		3
	PWR	GND	9	10	UIM_DATA		3
		PCIE_mini CLK#	11	12	UIM_CLK		3
		PCIE_mini CLK	13	14	UIM_RESET		3
	PWR	GND	15	16	UIM_VPP		3
3	NC	UIM_IC_DM	17	18	GND	PWR	
3	NC	UIM_IC_DP	19	20	W_Disable#		2
	PWR	GND	21	22	RST#		
		SATA2/PCIE_RXN	23	24	+3V3	PWR	
		SATA2/PCIE_RXP	25	26	GND	PWR	
	PWR	GND	27	28	+1.5V	PWR	
	PWR	GND	29	30	SMB_CLK		
		SATA2/PCIE_TXN	31	32	SMB_DATA		
		SATA2/PCIE_TXP	33	34	GND	PWR	
	PWR	GND	35	36	U_USB0N	IO	
	NC	NC	37	38	U_USB0P	IO	
	NC	NC	39	40	GND	PWR	
	NC	NC	41	42	NC	NC	
	NC	NC	43	44	NC	NC	
	NC	NC	45	46	NC	NC	
	NC	NC	47	48	+1.5V	PWR	
	NC	NC	49	50	GND	PWR	
	NC	NC	51	52	+3V3	PWR	

Note 1: 10K ohm pull-up to 3V3 Dual.
Note 2: 2K2 ohm pull-up to 3V3 Dual.
Note 3: Signals used for SIM socket (J39) located on backside of mITX-E38.

9 Onboard - & mating connector types

The Mating connector(s) / Cable Kits(s) which are fitting the On-board connectors are listed in below table. The highlighted cable kits are included in the "mITX-E38 Cable & Driver Kit" PN 1056-6781. (Different quantity of each cable kit included, depending on the quantity of onboard connectors).

Connector		On-board Connectors		Mating Connectors / Cables	
		Manufacturer	Type no.	Manufacturer	Type no.
KBD/MSE	J26	Molex	171856-0006	Molex	**22-01-2065**
				Kontron	**PN 1053-2384 (cable)**
				Kontron	PN 1046-3381
SATA	J1	Molex	47080-4002	Molex	67489-8005
		A&A TECH.	SA07M-6123C	Kontron	**PN 821035 (cable)**
SATA	J15	Molex	47155-4001	Molex	67489-8005
		FOXCONN	LD1807V-S52T	Kontron	**PN 821035 (cable)**
Fan SOC Fan Sys Mic Headphone	J29 J28 J17 J34	Molex	53047-0410	-	-
		EFCO	1250S-04TW		
PowerOut	J32	Molex	22-23-2041	Molex	22-01-2046
		TE Connectivity	640456-4	Kontron	**PN 1027-3669 (cable)**
Int12V	J7	FOXCONN	HM3502E	Molex	39-01-2045
		Molex	39-28-1043	Kontron	PN 1052-5818 (cable)
LVDS	J31	DON CONNEX	C44-40BSBC1-G	Don Connex	A32-40-C-G-B-1
		WIESON TECH.	G2124-03200101-00	Kontron	PN 910000005
		Hon Kon Tech,	HB12-220-VFS-20R	Kontron	**PN 821515 (cable)**
		SAMTEC	SHF-120-01-F-D-SM-K-TR	Kontron	KT 821155 (cable)
COM1 –COM6	J9, J10, J18, J19, J37, J38	FOXCONN	HL2205F	Molex	90635-1103
		PINREX	510-90-10GB00	Kontron	PN 821017 (cable)
		CEN Link Co., Ltd	ZP91-014B1-10Y1	Kontron	**PN 821016 (cable)**
USB6	J21	FOXCONN	HC11051-P9	CKM	CKM25420102-2x5
USB4/5 *	-	(FRONTPNL)	-	Kontron	**PN 821401 (cable)**
LPC	J30	FOXCONN	HC11101-P0		
		WIESON TECH.	G2100C888-034H		
Always On	J36	FOXCONN	HB11031	-	-
Clear CMOS	J3	PINREX	210-81-03GB01		
SPDIFout	J33	Molex	53047-0210	-	-
SPI	J16	FOXCONN	HC11051	-	-
XDP	J40	(Not mounted)	(Not mounted)	-	-
FRONTPNL	J12	PINREX	510-80-24GB05	Molex	90635-1243
		FOXCONN	HL2112V-P9	Kontron	**PN 821042 (cable)**
FEATURE	J27	Molex	87831-4420	Don Connex	A05c-44-B-G-A-1-G
		PINREX	52A-90-44GB00	Kontron	**PN 1052-5885 (Cable)**

* USB4/USB5 is located in FRONTPNL. Depending on application PN 821401 cable kit can be used.

Note: In above table, more than one connector can be listed for each type of on-board connector, if they all have same fit, form and function and are approved by Kontron as an alternative. Please notice that standard connectors like DP, PCIe, mPCIe, Audio Jack, Ethernet and USB are not included in the list.

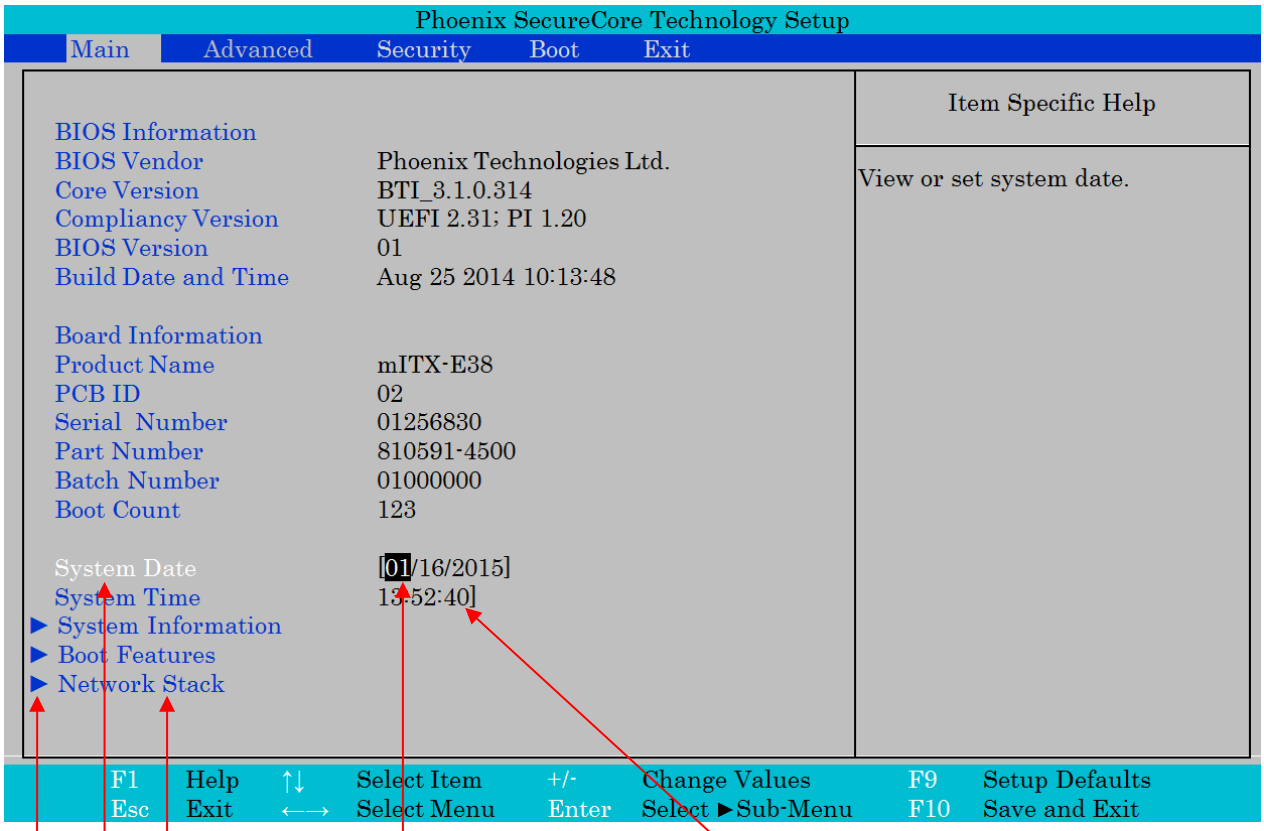
10 BIOS

The BIOS Setup is used to view and configure BIOS settings for the board. The BIOS Setup is accessed by pressing the <Del>-key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins.

From the EFI Shell write "Exit" followed by <TAB> and <Return> in order to enter BIOS Menu menu.

The BIOS settings will be loaded automatically when selecting "load Optimized Defaults" or "Load Setup Defaults" see "Save & Exit" menu. In this Users Guide the Optimized Defaults has been loaded. The default settings are indicated by **bold**. Please notice that "Load Setup Defaults" might have different set of default values.

10.1 Main



Sub Menu available.

White text for actual selected function which can be modified.

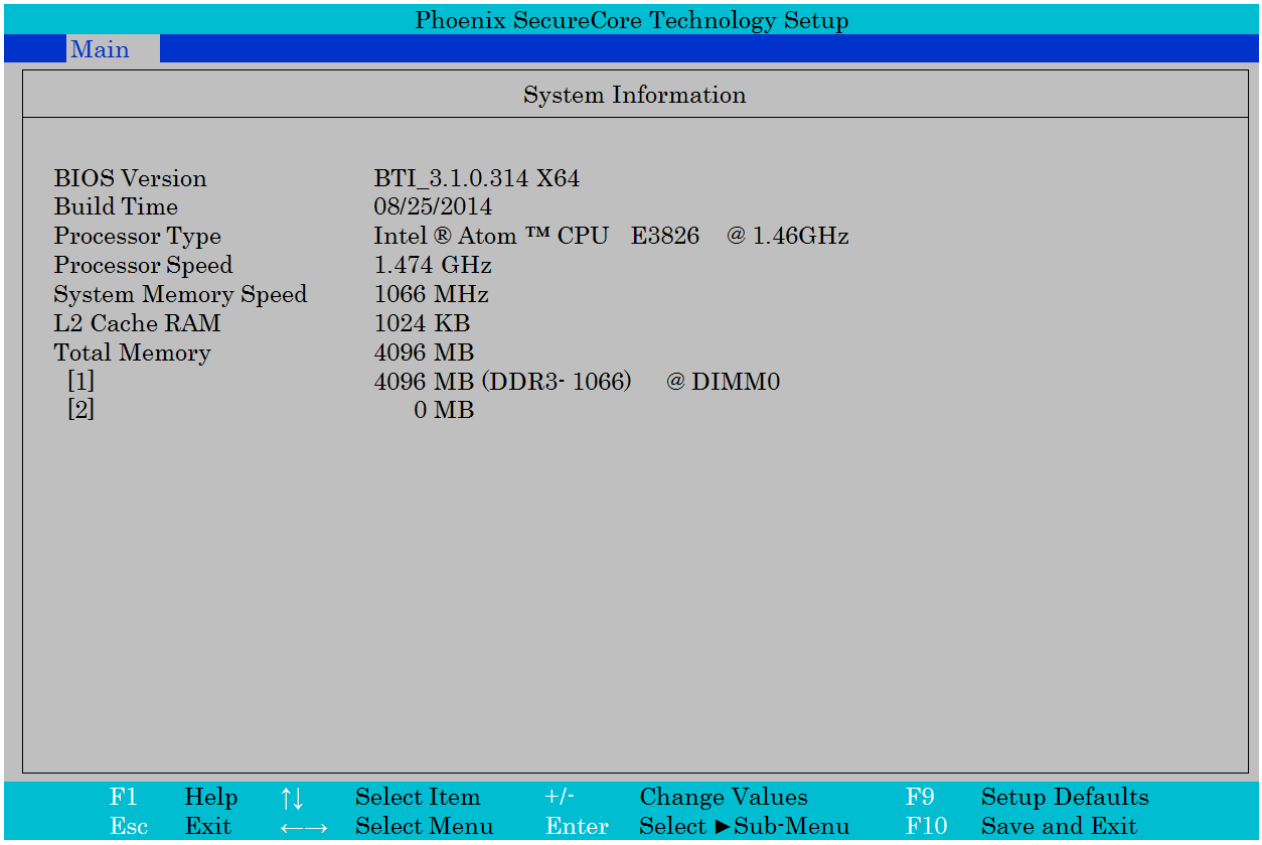
Blue text for functions (not all can be modified).

Black background for actual selection. Black text actual settings.

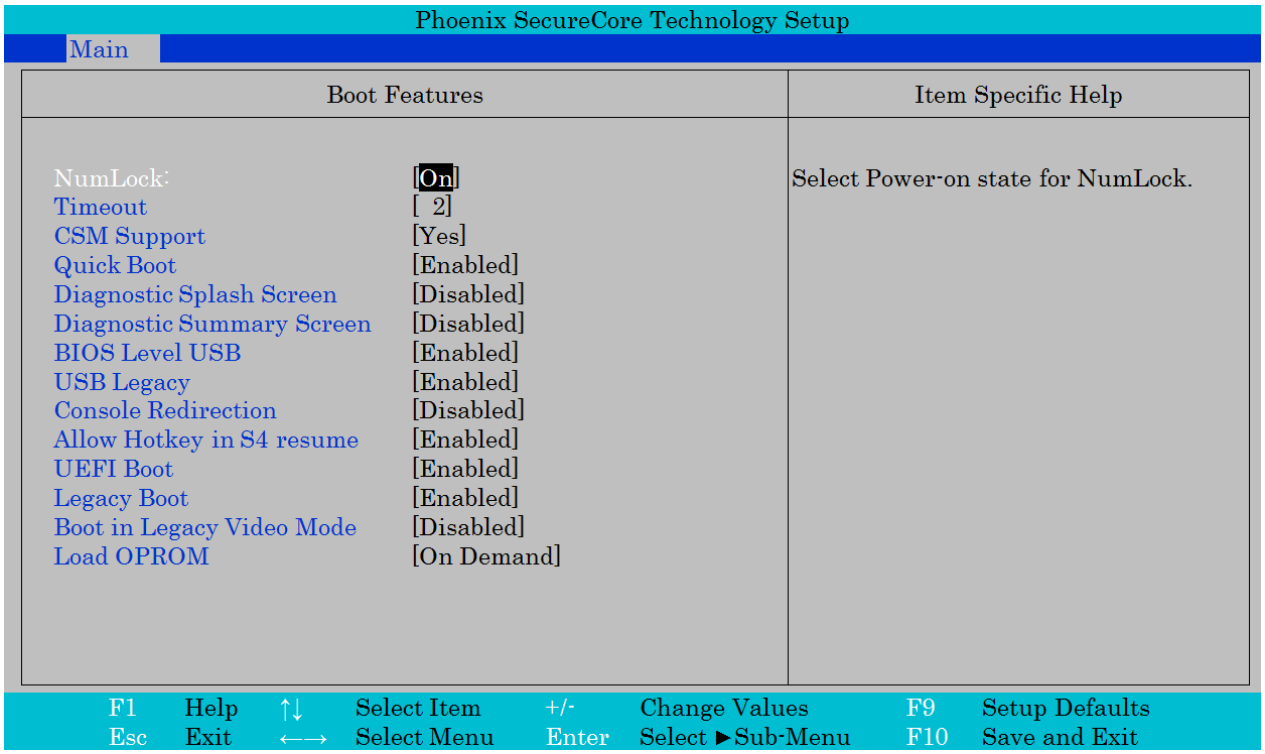
The following table describes the changeable settings:

Feature	Options	Description
System Date	MM/DD/YYYY	Set the system date.
System Time	HH:MM:SS	Set the system time.

System Information



Boot Features



Function	Selection	Description
NumLock:	**On** Off	Select Power-on state for NumLock.
Timeout	0,1,**2**, ...99 Note 1	Number of seconds that P.O.S.T will wait for the user input before booting.
CSM Support	No **Yes**	Compatibility Support Module that provides backward compatibility services for legacy BIOS services, like int10/int13, dependent OS.
Quick Boot	Disabled **Enabled**	Enable/Disable quick boot.
Diagnostic Splash Screen	**Disabled** Enabled Note 3	If you select 'Enabled' the diagnostic splash screen always displays during boot. If you select 'Disabled' the diagnostic splash screen does not display unless you press HOTKEY during boot.
Diagnostic Summary Screen	**Disabled** Enabled Note 3	Display the diagnostic summary screen during boot.
BIOS Level USB	**Disabled** Enabled	Enable/Disable all BIOS support for USB in order to reduce boot time. Note that this will prevent using a USB biometric scanner such as a finger print reader to control access to setup, but does not prevent the operating system from supporting such hardware.
USB Legacy	Disabled **Enabled** Note 4	Enable/Disable USB BIOS SMM support for mouse, keyboard, mass storage, etc., in legacy operating systems such as DOS.
Console Redirection	**Disabled** Enabled	Enable/Disable Universal Console Redirection.
Allow Hotkey in S4 resume	Disabled **Enabled**	Enable hotkey detection when system resuming from Hibernate state.
UEFI Boot	Disabled **Enabled**	Enable the UEFI boot.
Legacy Boot	**Disabled** Enabled	Enable the Legacy boot.
Boot in Legacy Video Mode	**Disabled** Enabled Note 2	Enable to force the display adapter to switch the video mode to Text Mode 3 at the end of BIOS POST for non-UEFI boot mode (Legacy Boot). Some legacy software, such as DUET, requires that the BIOS explicitly enter text video mode prior to boot.
Load OPROM	**All** On Demand Note 2	Load all OPROMs or on demand according to the boot device.

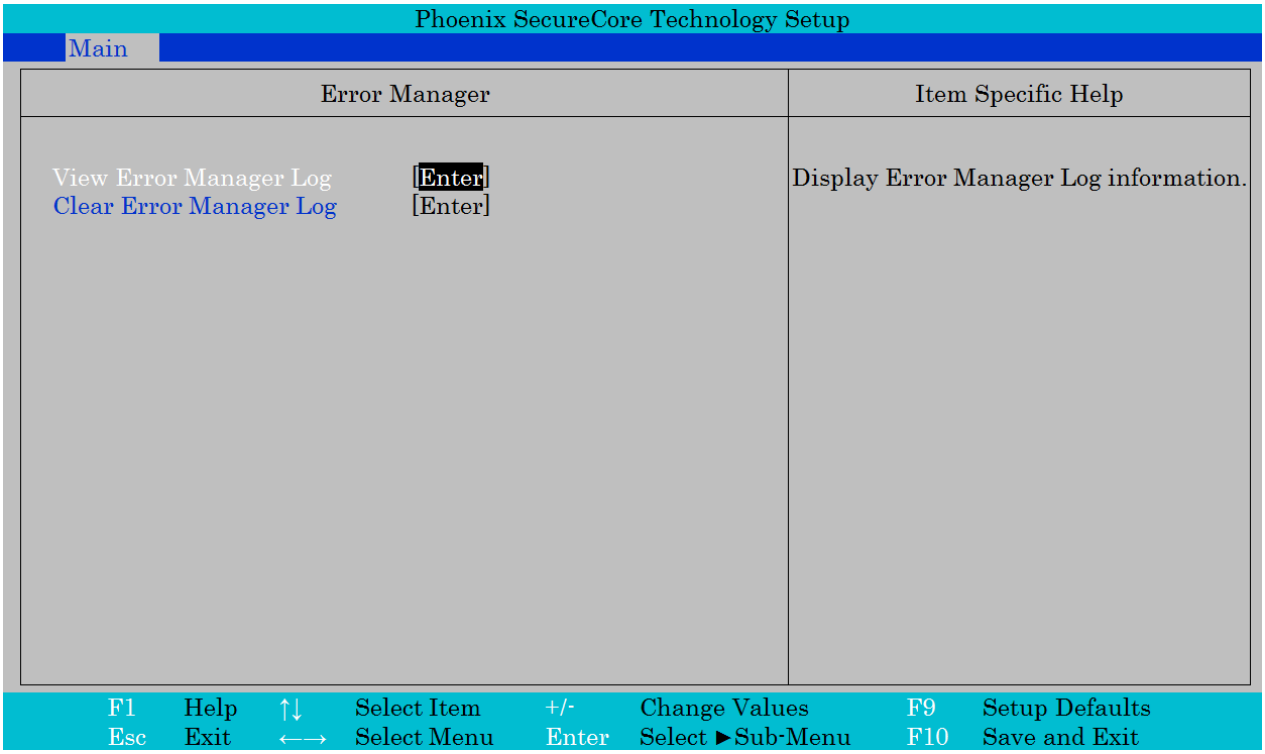
Note 1: Use either digit keys to enter value (0 – 99) or +/- keys to increase/decrease value.

Note 2: Only visible if Legacy Boot = Enabled.

Note 3: Only selectable if Quick Boot = Disabled.

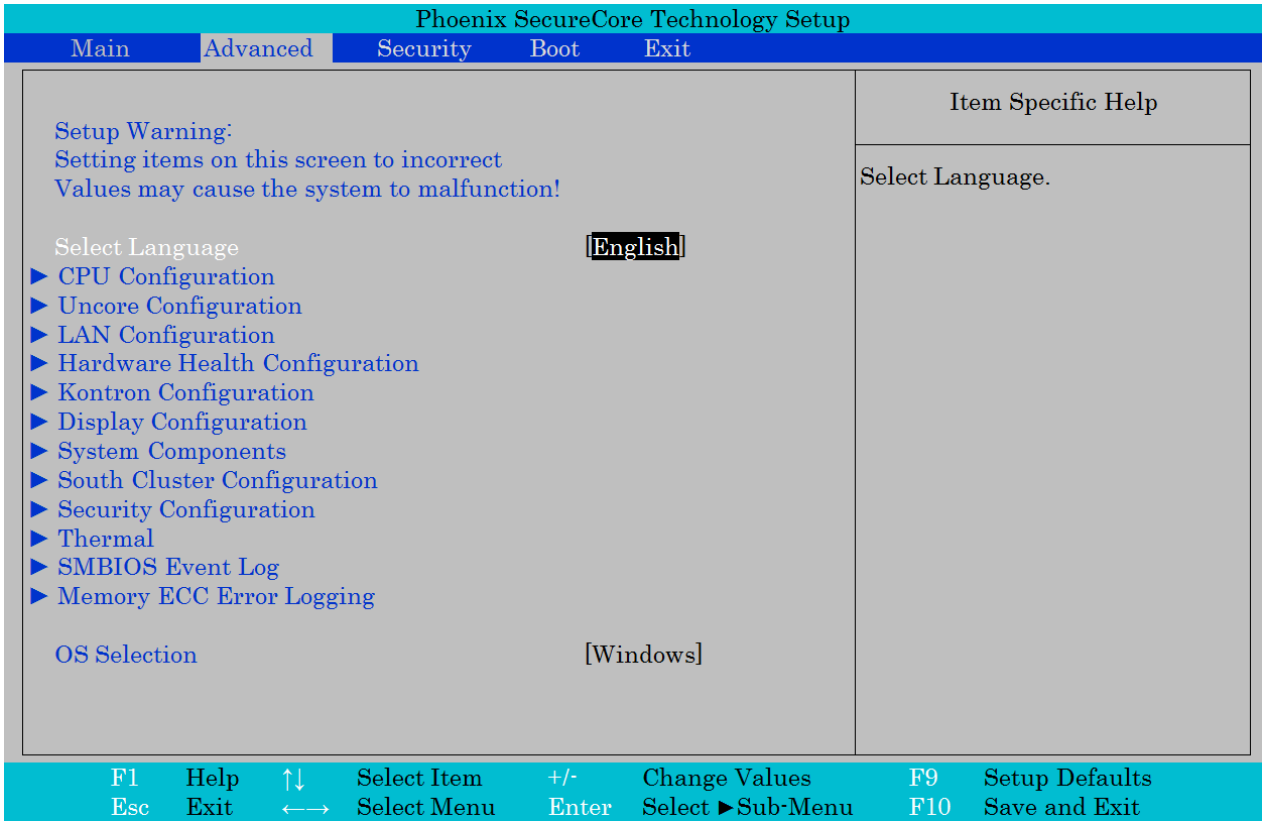
Note 4: Only selectable if BIOS Level USB = Enabled.

Error Manager



Function	Selection	Description
View Error Manager Log	**Enter**	Display Error Manager Log information.
Clear Error Manager Log	**Enter**	Clear Error Manager Log

10.2 Advanced



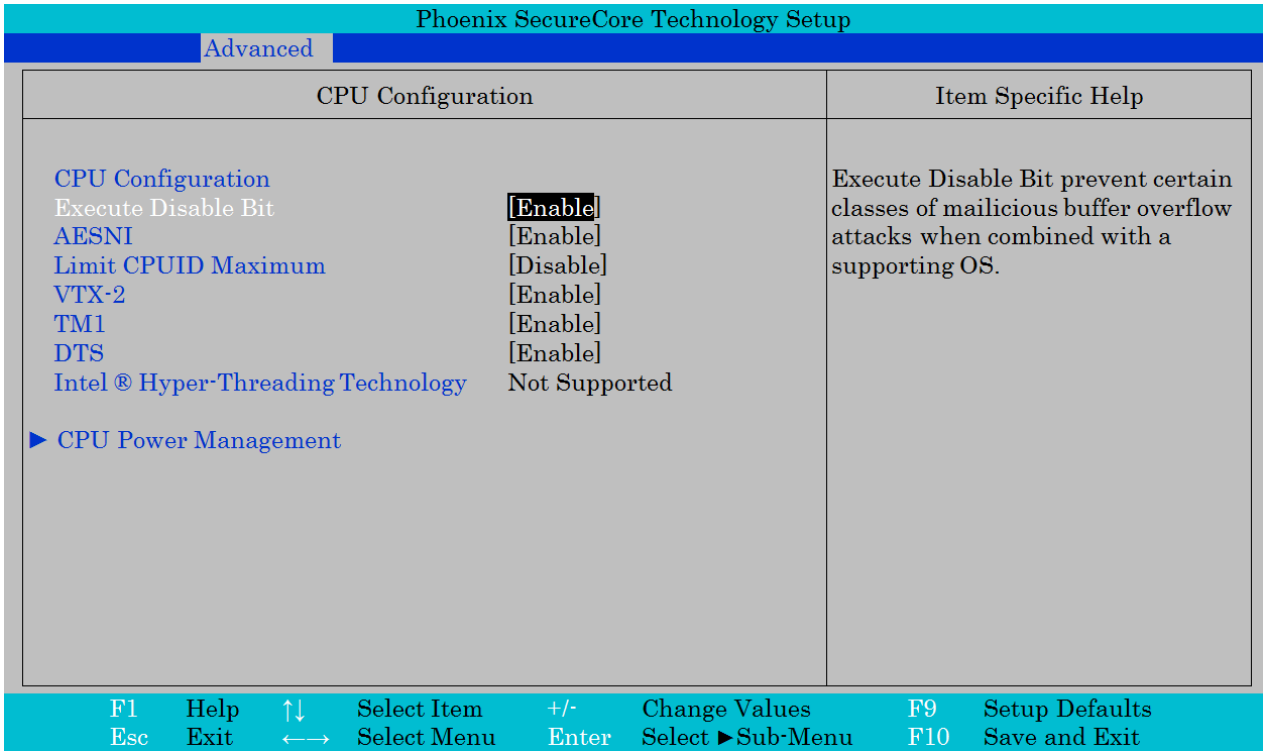
The Advanced (main) menu contains only submenu selections which will be described in more details on the following pages.

In order to make a selection of a submenu activated the ↑↓ keys until the requested submenu becomes white color, then activate the <Enter>.

Function	Selection	Description
Select Language	**English** Francais Etc.	Select Language.
OS Selection	**Windows** Linux Android	OS Selection

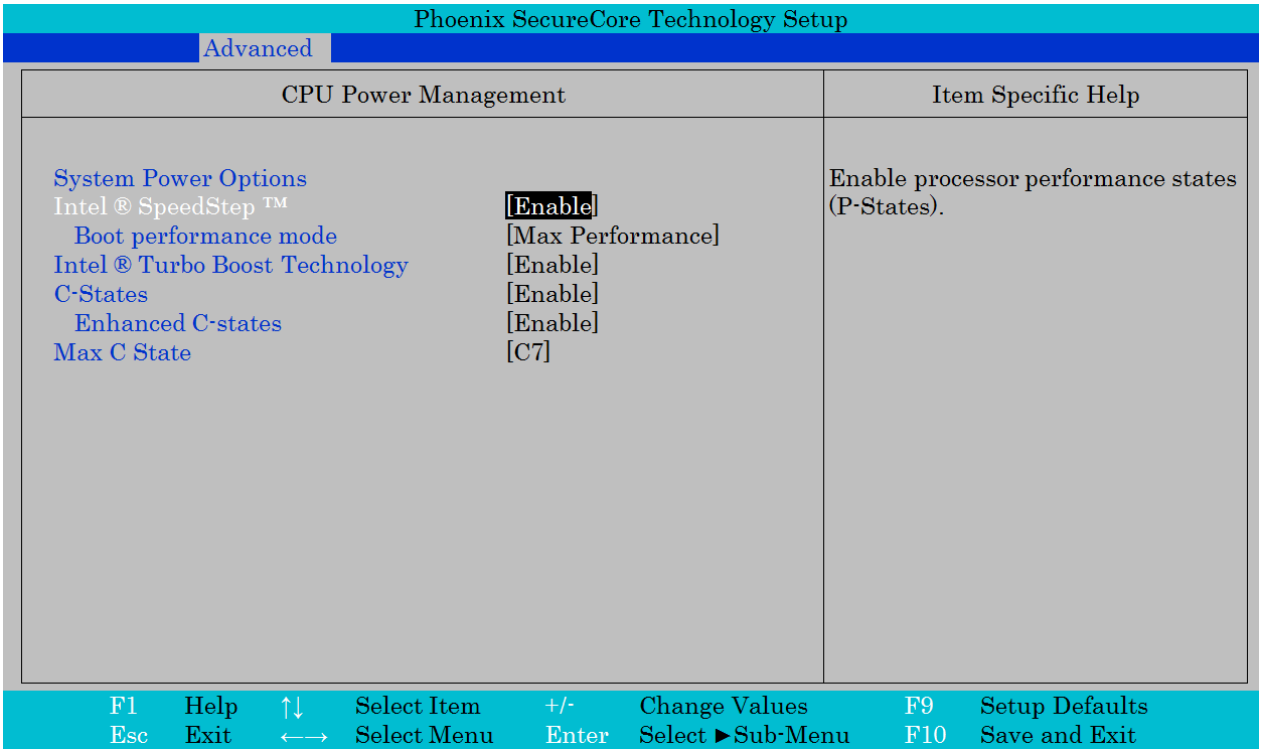
Note: OS Selection must be set in according to the requested OS to boot. If incorrect OS Selection then system will not boot correctly.

CPU Configuration



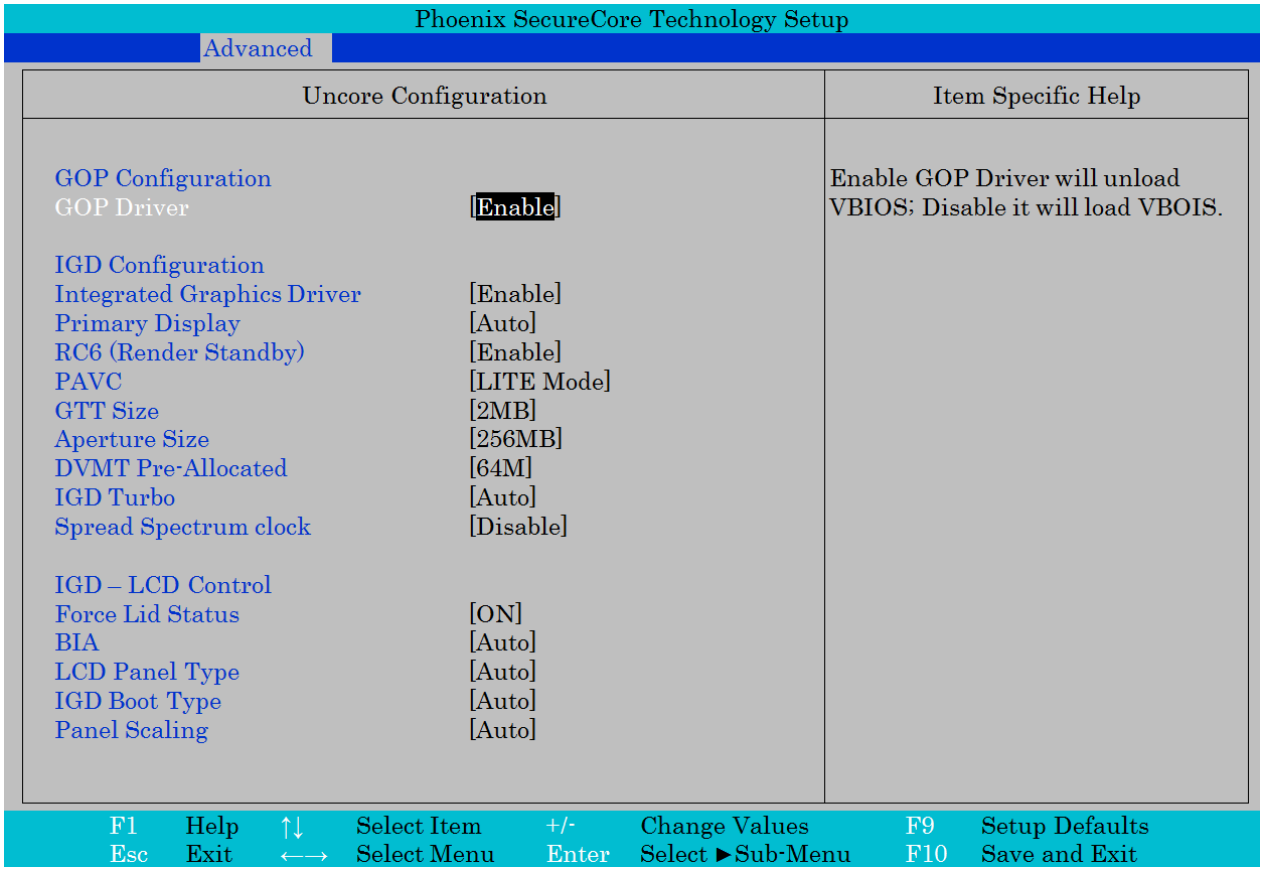
Function	Selection	Description
Execute Disable Bit	Disable **Enable**	Execute Disable Bit prevent certain classes of mailicious buffer overflow attacks when combined with a supporting OS.
AESNI	Disable **Enable**	AESNI.
Limit CPUID Maximum	**Disable** Enable	Disabled for Windows XP.
VTX-2	Disabled **Enabled**	To enable or disable the VTX-2 Mode support.
TM1	Disabled **Enabled**	Enabled/Disable TM1.
DTS	Disabled **Enabled**	Enabled/Disable Digital Thermal Sensor.

CPU Power Management



Function	Selection	Description
Intel ® SpeedStep ™	Disable **Enable**	Enable processor performance states (P-States).
Boot performance mode	**Max Performance** Max Battery	Select the performance state that the BIOS will set before OS handoff.
Intel ® Turbo Boost Technology	Disable **Enable**	Enable to automatically allow processor cores to run faster then the base operating frequency if it´s operating below power, current, and temperature specification limits.
C-States	Disabled **Enabled**	Enable/Disable C States.
Enhanced C-states	Disabled **Enabled**	Enable/Disable C1E, C2E and C4E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
Max C State	**C7** C6 C4 C1	This option controls the Max C State that the processor will support.

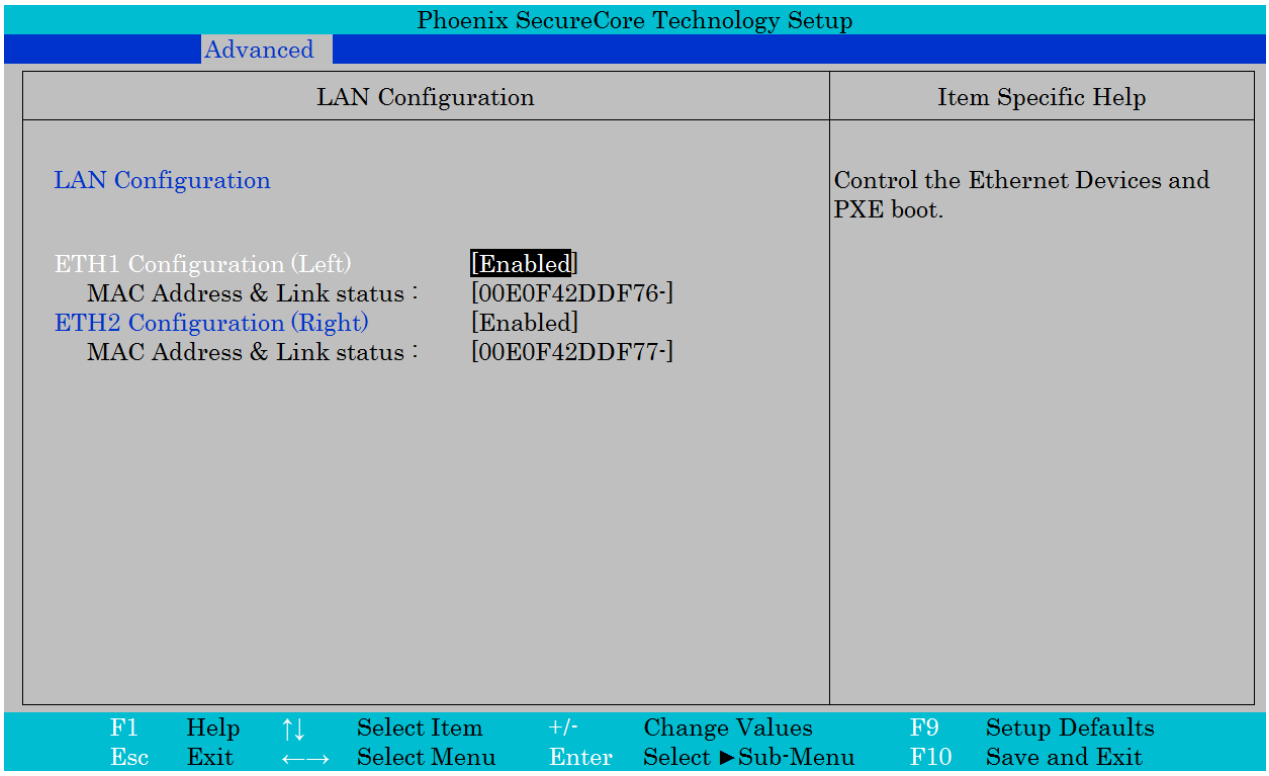
Uncore Configuration



Function	Selection	Description
GOP Driver	Disabled **Enabled**	Enable GOP Driver will unload VBIOS; Disable it will load VBOIS.
Integrated Graphics Driver	Disabled **Enabled**	Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor.Disable: Always disabled IGD.
Primary Display	**AUTO** IGD PCIe SG	Select which of IGD/PCI Graphics device should be Primary Display Or select SG for Switchable/Hybrid Gfx.
RC6 (Render Standby)	Disabled **Enabled**	Check to enable render standby support.
PAVC	Disable **LITE Mode** SERPENT Mode	Enable/Disable Protected Audio Video Control.
GTT Size	1MB **2MB**	Select the GTT Size.
Aperture Size	128MB **256MB** 512MB	Select the Aperture Size.
DVMT Pre-Allocated	**64M**, 96M, ..., 512M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.

Function	Selection	Description
IGD Turbo	**Auto** Enable Disable	Select the IGD Turbo feature, if Auto selected, IGD Turbo will only be enabled when SOC stepping is B0 or above.
Spread Spectrum clock	**Disabled** Enable	Enable clock chip Spread Spectrum feature.
Force Lid Status	OFF **ON**	For test: force to set lid status as on or off.
BIA	**Auto** Disabled Level 1 Level 2 Level 3 Level 4 Level 5	>> Auto: GMCH Use VBIOS Default; >>Level n: Enabled with Selected Aggressiveness Level.
LCD Panel Type	**Auto** Panel1 640 x 480 Panel2 800 x 600 Panel3 1024 x 768 Panel4 1280 x 1024 Panel5 1400 x 1050 Panel6 1400 x 1050 Panel7 1600 x 1200 Panel8 1360 x 768 Panel9 1680 x 1050 Panel10 1820 x 1200 Panel11 1440 x 900 Panel12 1280 x 1024 Panel13 1600 x 900 Panel14 1024 x768 Panel15 1920 x 1080 Panel16 2048 x 1536	
IGD Boot Type	**Auto** VGA Port HDMI Port B DP Port B DP Port C eDP DSI Port A DSI Port C	Selects preference for Integrated Graphics Device (IGD) display interface used when system boots. If CSM Enable: HDMI PortB=EFP1 DP PortB=EFP1 DP PortC=EFP2 eDP=LFP1 DSI PortA=LFP2 DSI PortC=LFP2
Panel Scaling	**Auto** Centering Stretching	Select the LCD panel scaling option used by Internal Graphics Device.

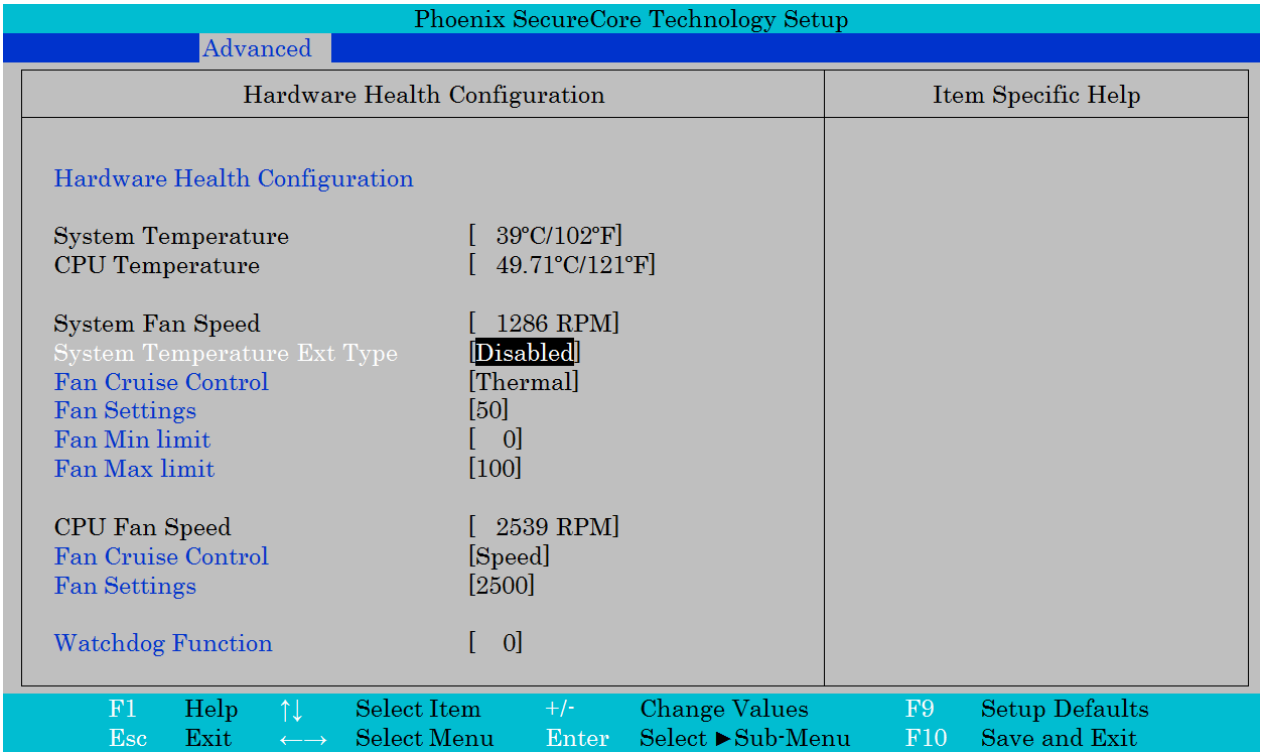
LAN Configuration



Note: The "+" and "-"(to the right of the MAC address) indicates respectively if link is established or not.

Function	Selection	Description
ETH1 Configuration	Disabled **Enabled** With PXE boot	Control the Ethernet Devices and PXE boot.
ETH2 Configuration	Disabled **Enabled** With PXE boot	Control the Ethernet Devices and PXE boot.

Hardware Health Configuration



Note: *System Temperature* readout is the temperature measured by the selected sensor via *System Temperature Ext Type*. If disabled then onboard sensor (U86, LM75ADP) is used. The CPU Temperature is measured inside the SOC.

Function	Selection	Description
System Temperature Ext Type	**Disabled** (Note 1) LM75 @ 0x90 OneWire @ GPIO16	Use external connected sensor instead of onboard.
Fan Cruise Control (System)	Disabled Thermal Speed	Disabled = Full speed. Thermal: Regulate according to specified °C. Speed: Regulate according to specified RPM.
Fan Settings (System)	30 – 90 (note2) 1000 – 10000 (note3)	
Fan Min limit (Note 4) (System)	0 (note5)	Minimum PWM %, can be used to make sure fan is always active. Make sure Min limit < Max limit.
Fan Max limit (Note 4) (System)	100 (note5)	Maximum PWM %, can be used to limit the fan noise. Make sure Min limit < Max limit.
Fan Cruise Control (CPU)	Disabled Speed	Disabled = Full speed. Speed: Regulate according to specified RPM.
Fan Settings (CPU)	1000 – 10000 (note3)	
Watchdog Function	0 - 255 (note6)	0 = Disabled. Enter the service interval in seconds before system will reset.

Note 1: When not Disabled then the *System Temperature* readout will only be valid if the sensor is physically connected to the Feature connector.

Note 2: °C (if *Fan Cruise Control* is *Thermal*) then use either digit keys to enter value or +/- keys to increase/decrease value. Don't use mix of digit keys and +/- keys.

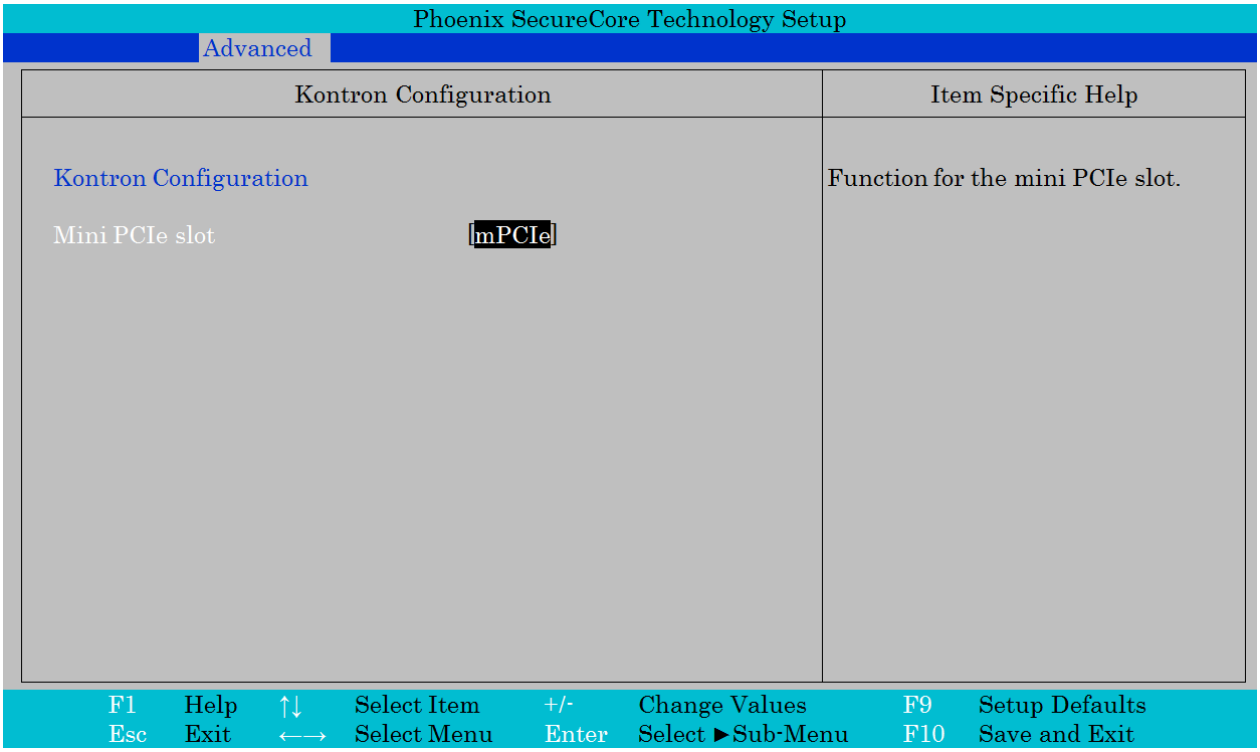
Note 3: RPM (if *Fan Cruise Control* is *Speed*) use either digit keys to enter value or +/- keys to increase/decrease value by 100. Don't use mix of digit keys and +/- keys.

Note 4: Only visible if *Fan Cruise Control* is *Thermal*.

Note5: Use number keys to enter value.

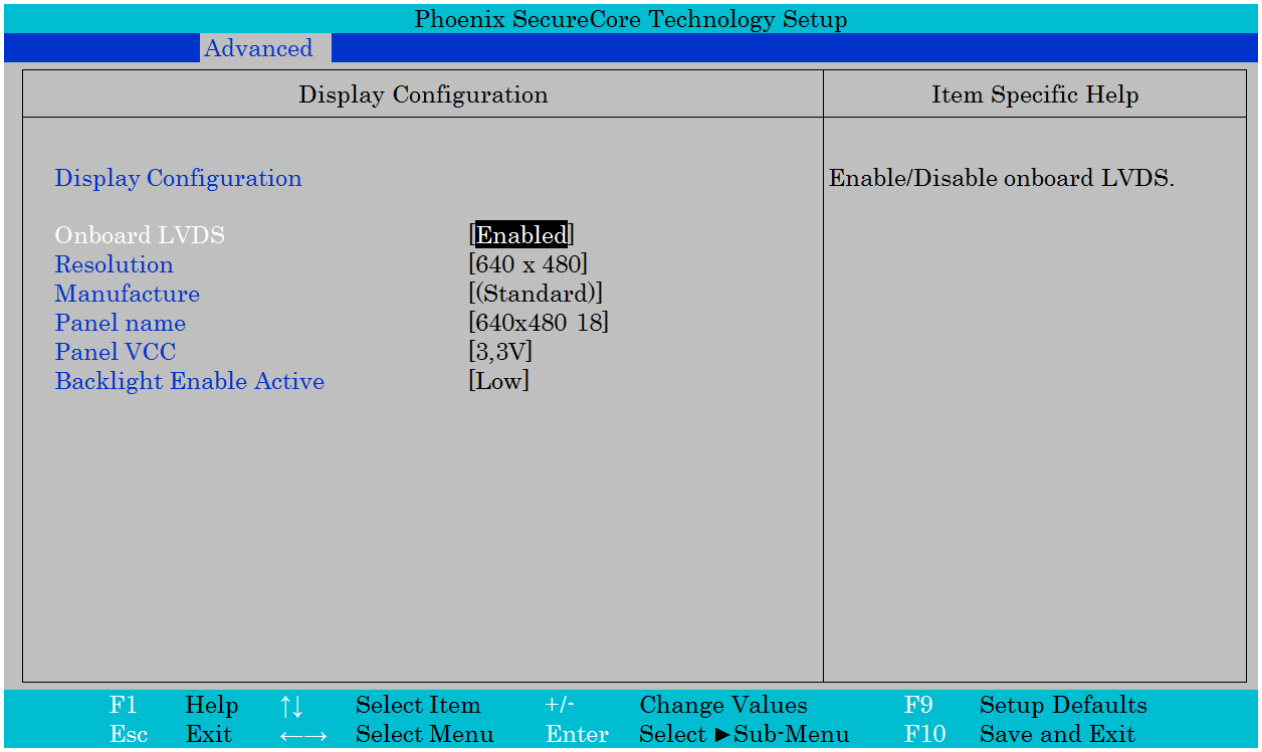
Note 6: Seconds, use digit keys to enter value. Value 0 means Watchdog is disabled. Refer to "KT-API-V2 User Manual" to control the Watchdog via API or refer to "KT-API-V2 User Manual DLL" how to control Watchdog via Windows DLL.

Kontron Configuration



Function	Selection	Description
Mini PCIe slot	**mPCIe** mSATA	Function for the mini PCIe slot.

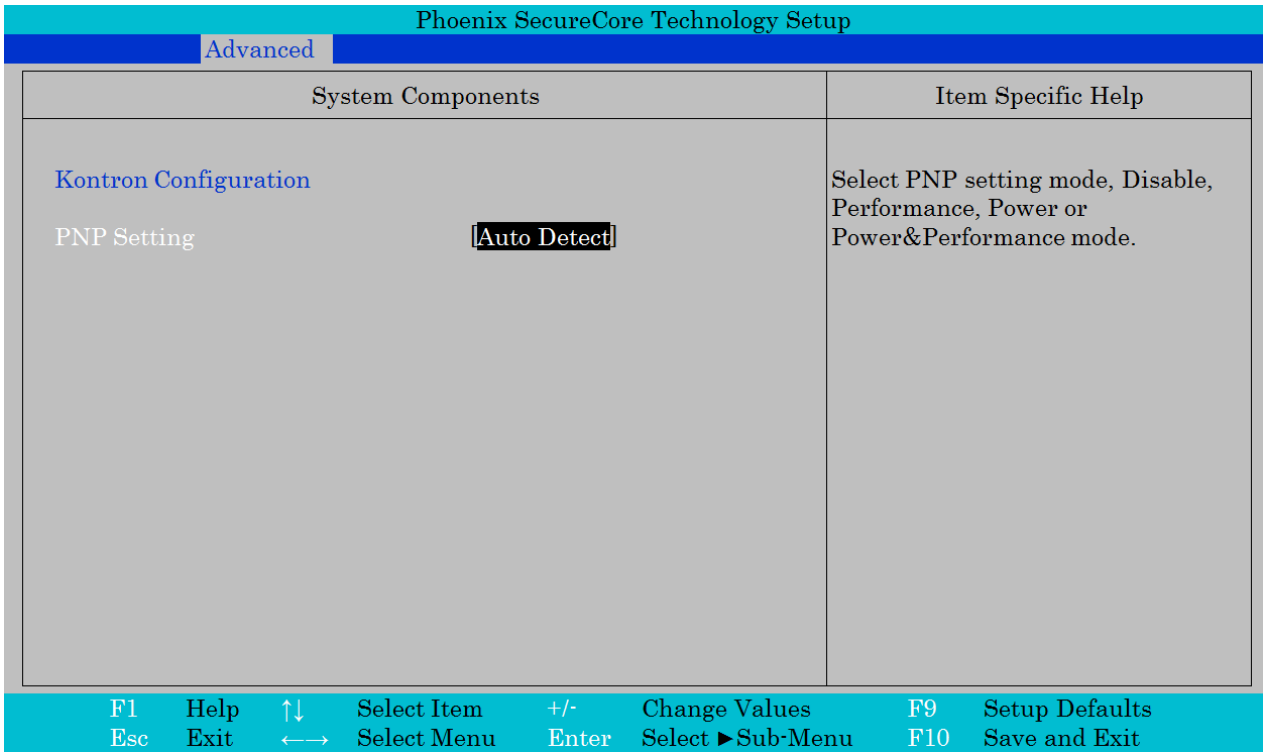
Display Configuration



Function	Selection	Description
Onboard LVDS	**Disabled** Enabled	Enable/Disable onboard LVDS.
Resolution	**640 x 480** 800 x 480 800 x 600 1024 x 600 1024 x 768 1280 x 800 1280 x 1024 1366 x 768 1600 x 1200 1920 x 1080 Custom	Resolution of panel to select.
Manufacture	**(Standard)** AUO Philips Primeview Samsung	Manufacture of panel to select.
Panel name Note1	**640x480 18** 640x480 24 N/A	Name of panel to select.
Panel VCC	**3,3V** 5V	VCC of panel selected panel.
Backlight Enable Active	**Low** High	Inversion of backlight signal.

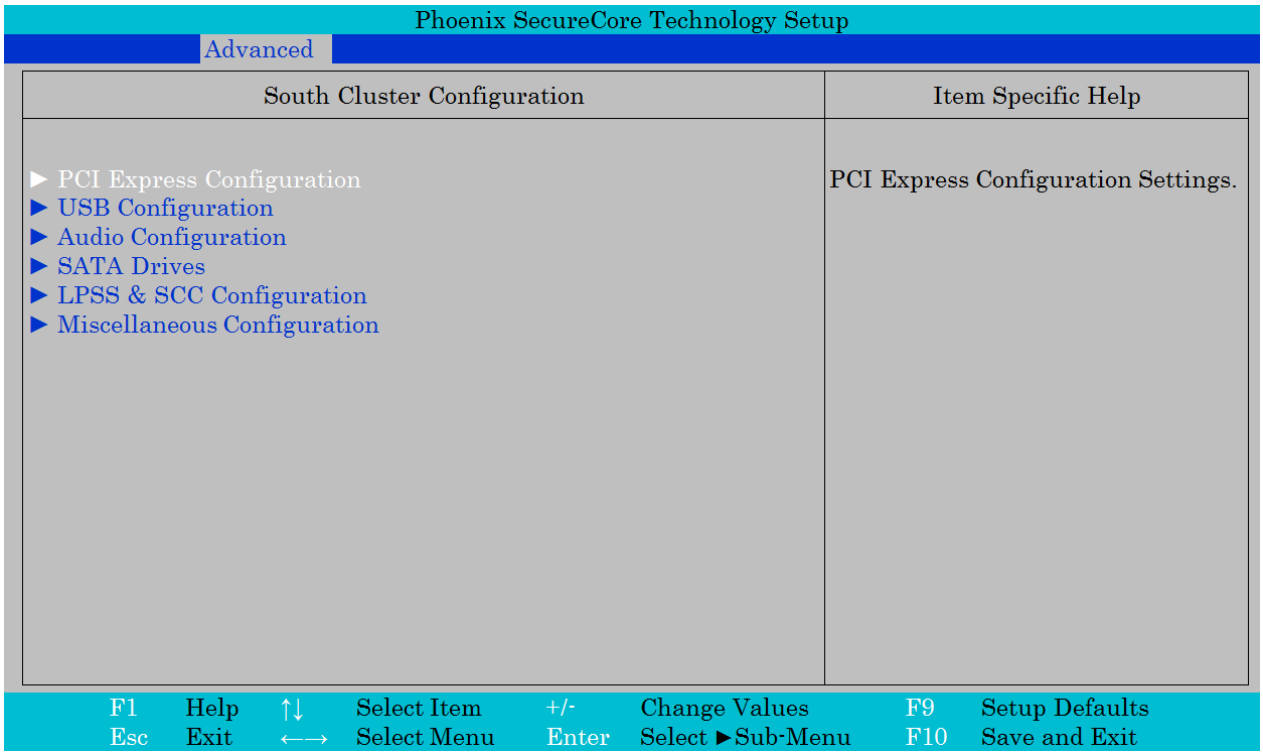
Note1: Depend on Resolution and Manufacture combination. If combination does'nt exist then Panel name is N/A (Not Available).

System Components

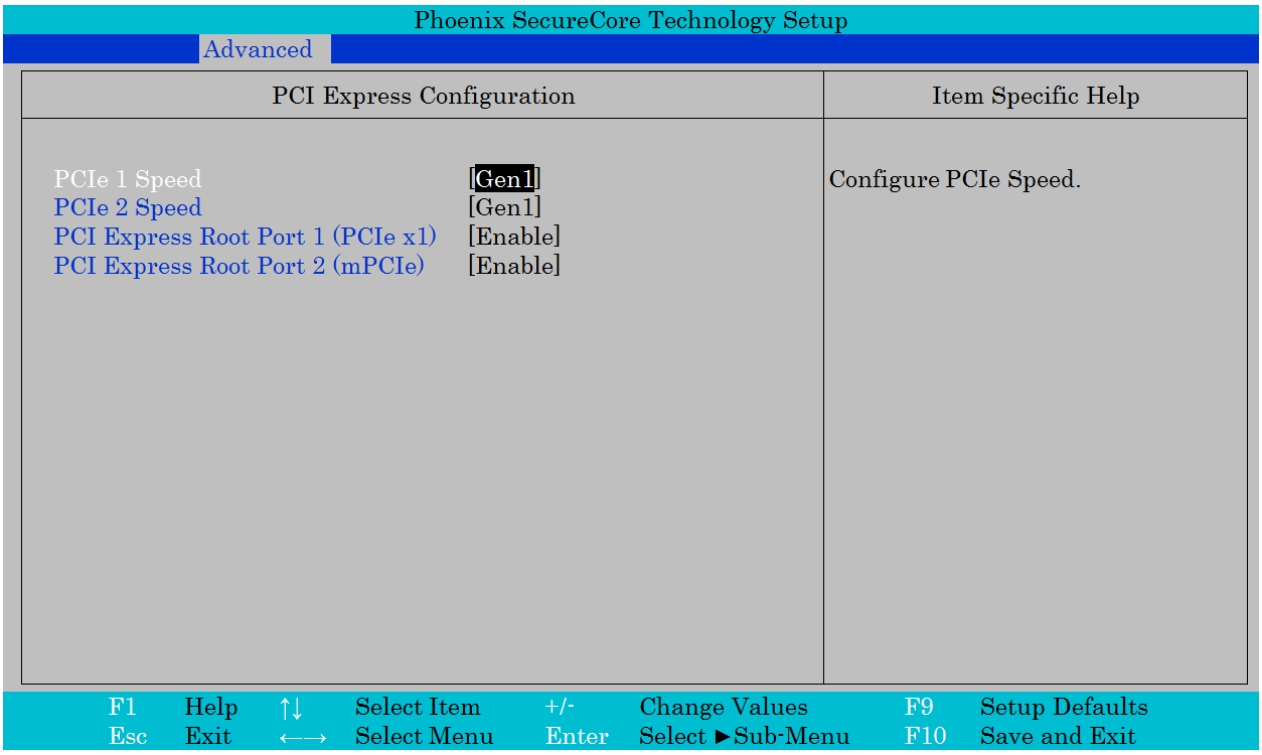


Function	Selection	Description
PNP Setting	Disable **Auto Detect** Ax Stepping Bx Stepping	Select PNP setting mode, Disable,Performance, Power or Power&Performance mode.

South Cluster Configuration

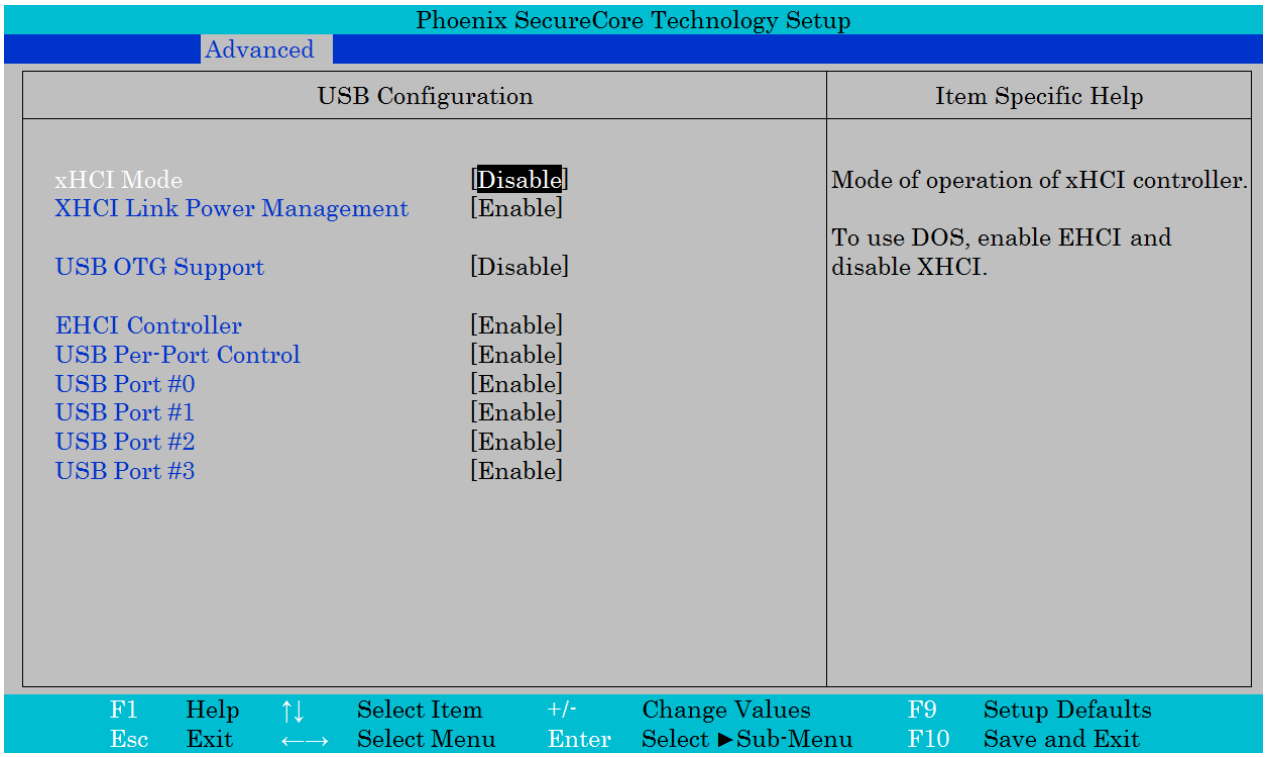


PCI Express Configuration



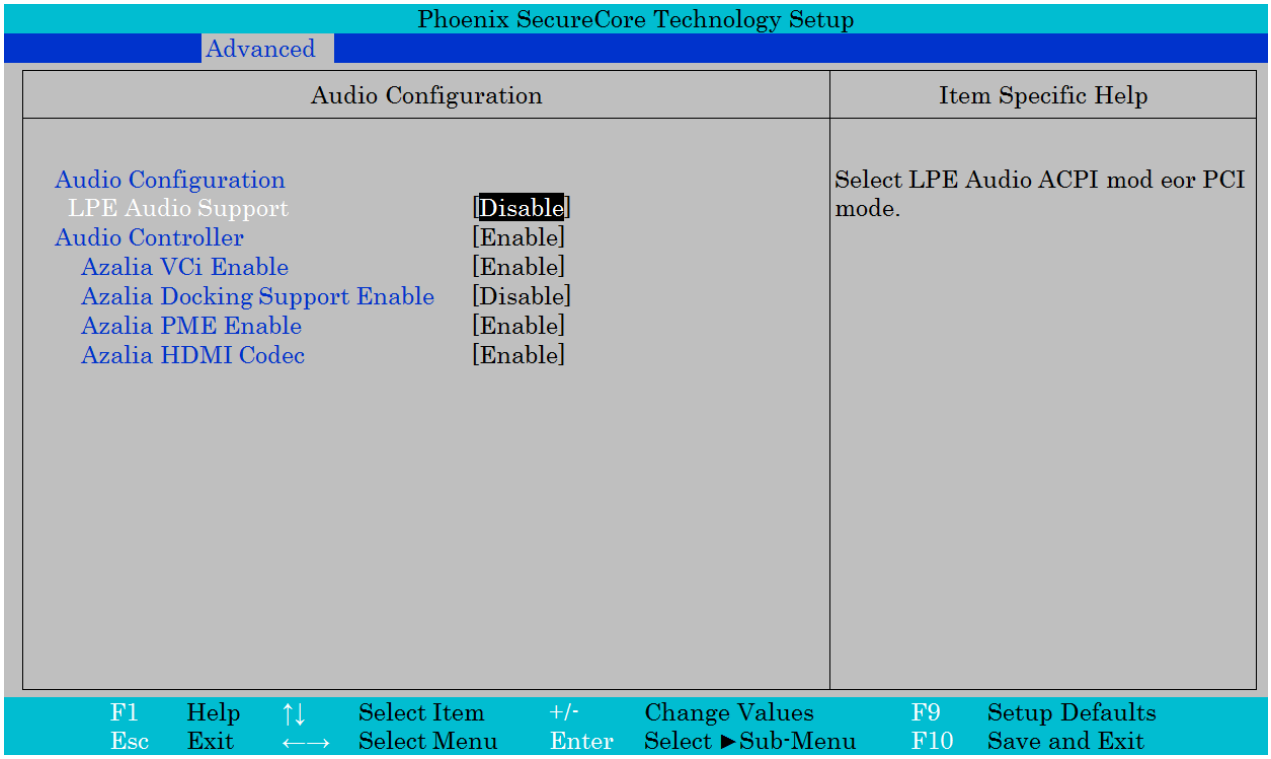
Function	Selection	Description
PCIe 1 Speed	Auto **Gen1** Gen2	Configure PCIe Speed.
PCIe 2 Speed	Auto **Gen1** Gen2	Configure PCIe Speed.
PCI Express Root Port 1	**Enable** Disable	Control the PCI Express Root Port.
PCI Express Root Port 2	**Enable** Disable	Control the PCI Express Root Port.

USB Configuration



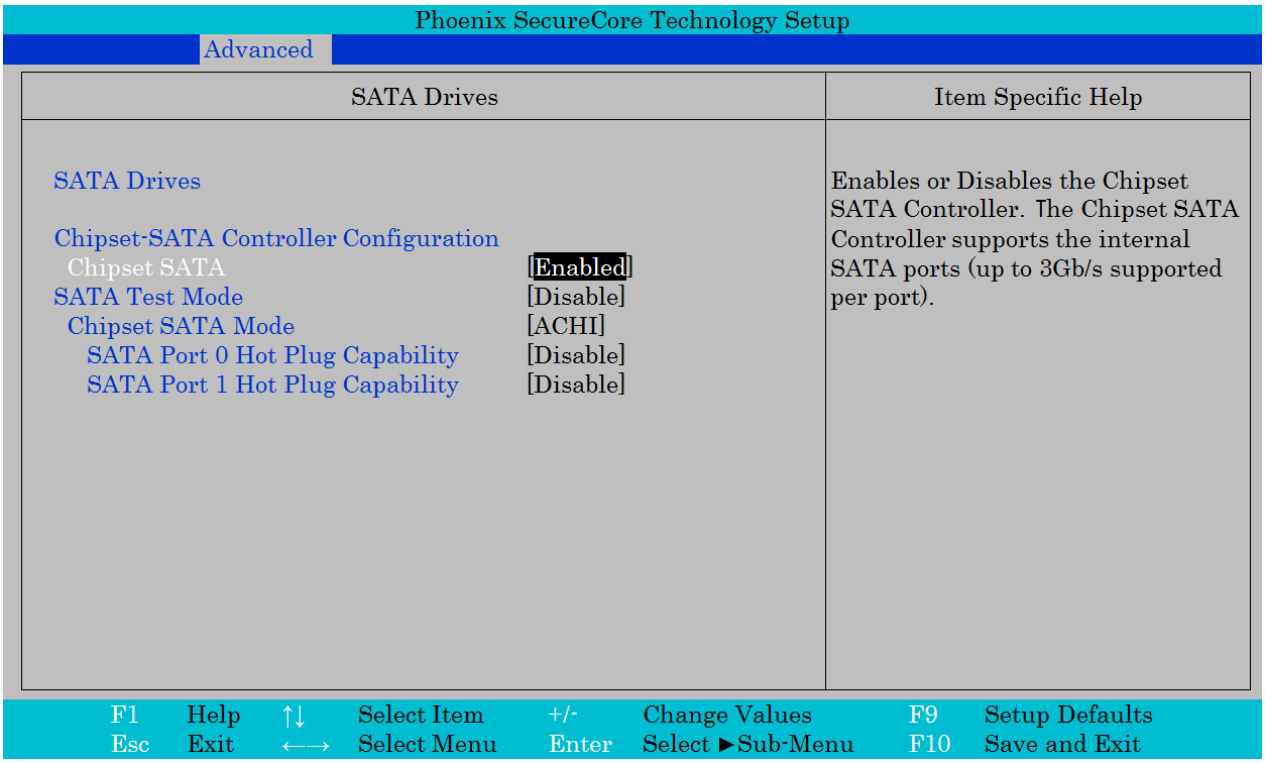
Function	Selection	Description
xHCI Mode	**Disable** Smart Auto	Mode of operation of xHCI controller. To use DOS, enable EHCI and disable XHCI.
XHCI Link Power Management	Disable **Enable**	Enable/Disable XHCI Link Power Management.
USB OTG Support	**Disable** PCI Mode ACPI Mode	Enable/Disable USB OTG Support
EHCI Controller	**Enable** Disable	Control the USB EHCI (USB 2.0) functions. One EHCI controller must always be enabled. To use DOS, enable EHCI and disable XHCI.
USB Per-Port Control	**Disable** Enable	Control each of the USB ports (0~3) disabling.
USB Port #0	Disable **Enable**	Disable USB port.
USB Port #1	Disable **Enable**	Disable USB port.
USB Port #2	Disable **Enable**	Disable USB port.
USB Port #3	Disable **Enable**	Disable USB port.

Audio Configuration



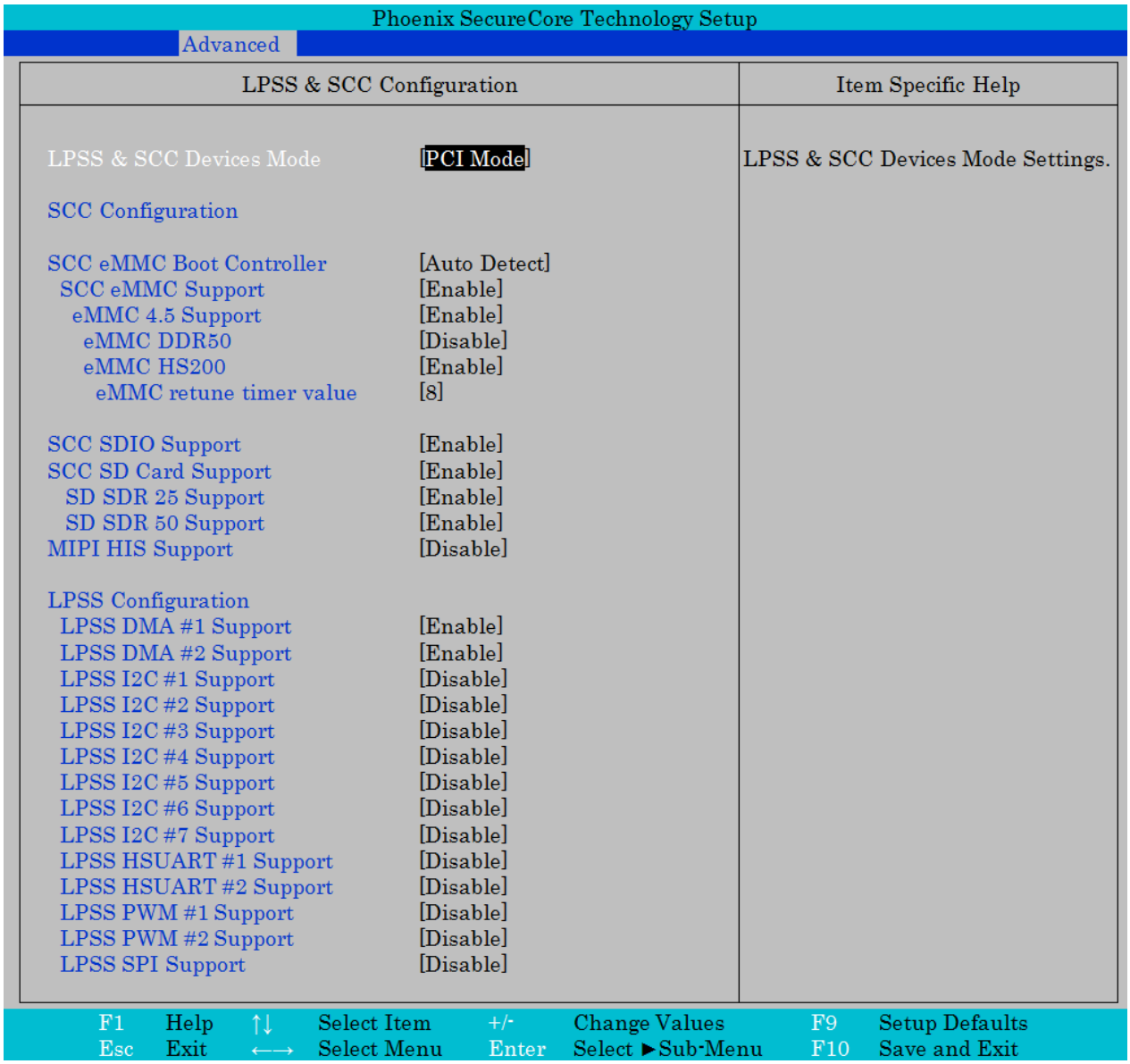
Function	Selection	Description
LPE Audio Support	**Disable** LPE Audio PCI mode LPE Audio ACPI mode	Select LPE Audio ACPI mode or PCI mode.
Audio Controller	Disable **Enable**	Control Detection of the Azalia device. Disabled = Azalia will be unconditionally disabled. Enabled = Azalia will be unconditionally Enabled.
Azalia VCi Enable	Disable **Enable**	Enable/Disable Virtual Channel 1 of Audio Controller.
Azalia Docking Support Enable	**Disable** Enable	Enable/Disable Azalia Docking Support of Audio Controller.
Azalia PME Enable	Disable **Enable**	Enable/Disable Power Management capability of Audio Controller.
Azalia HDMI Codec	Disable **Enable**	Enable/Disable internal HDMI codec for Azalia.

SATA Drives



Function	Selection	Description
Chipset SATA	**Enable** Disable	Enables or Disables the Chipset SATA Controller. The Chipset SATA Controller supports the internal SATA ports (up to 3Gb/s supported per port).
SATA Test Mode	Enable **Disable**	Test Mode Enable/Disable.
Chipset SATA Mode	IDE **AHCI**	IDE: Compatibility mode disables AHCI support. AHCI: Supports advanced SATA features such as Native Command Queuing. Warning: OS may not boot if this setting is changed after OS install.
SATA Port 0 Hot Plug Capability	Enable **Disable**	If enabled, SATA port will be reported as Hot Plug capable. Note: Requires hardware support.
SATA Port 1 Hot Plug Capability	Enable **Disable**	If enabled, SATA port will be reported as Hot Plug capable. Note: Requires hardware support.

LPSS & SCC Configuration

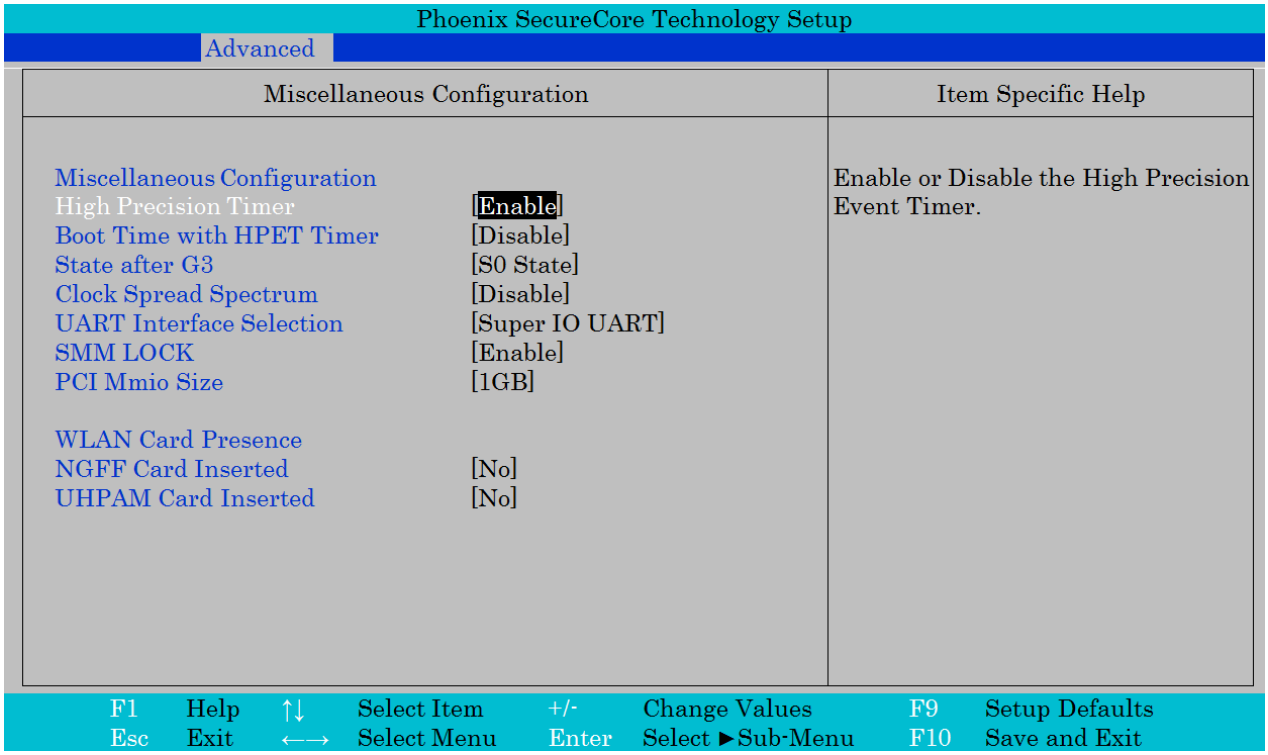


Function	Selection	Description
LPSS & SCC Device Mode	ACPI Mode **PCI Mode**	LPSS & SCC Devices Mode Settings.
SCC eMMC Boot Controller	Disable **Auto Detect** eMMC 4.41 eMMC 4.5	Disable/Select eMMC Boot mode; Auto Detect mode can switch the eMMC controller against the stepping.
SCC eMMC Support	Disable **Enable**	SCC eMMC Support Enable\Disable.
eMMC 4.5 Support	Disable **Enable**	<< eMMC 4.5 Support >>: Enable - eMMC 4.5, Disable - eMMC 4.41
eMMC DDR50	**Disable** Enable	SSC eMMC 4.5 DDR50 Support Enable\Disable.

eMMC HS200	**Disable** Enable	SSC eMMC 4.5 HS200 Support Enable\Disable.
eMMC retune timer value (note1)	0,1,...**8**,...,15	
SCC SDIO Support	Disable **Enable**	SCC SDIO Support Enable\Disable.
SCC SD Card Support	Disable **Enable**	SCC SD Card Support Enable\Disable.
SD SDR 25 Support	Disable **Enable**	
SD SDR 50 Support	Disable **Enable**	
MIPI HIS Support	**Disable** Enable	MIPI HIS Support Support Enable\Disable.
LPSS DMA #1 Support	**Disable** Enable	LPSS DMA #1 Support Enable\Disable.
LPSS DMA #2 Support	**Disable** Enable	LPSS DMA #2 Support Enable\Disable.
LPSS I2C #1 Support (note3)	**Disable** Enable	LPSS I2C #1 Support Enable\Disable.
LPSS I2C #2 Support (note3)	**Disable** Enable	LPSS I2C #2 Support Enable\Disable.
LPSS I2C #3 Support (note3)	**Disable** Enable	LPSS I2C #3 Support Enable\Disable.
LPSS I2C #4 Support (note3)	**Disable** Enable	LPSS I2C #4 Support Enable\Disable.
LPSS I2C #5 Support (note3)	**Disable** Enable	LPSS I2C #5 Support Enable\Disable.
LPSS I2C #6 Support (note3)	**Disable** Enable	LPSS I2C #6Support Enable\Disable.
LPSS I2C #7 Support (note3)	**Disable** Enable	LPSS I2C #7 Support Enable\Disable.
LPSS HSUART #1 Support (note2)	**Disable** Enable	LPSS HSUART #1 Support Enable\Disable.
LPSS HSUART #2 Support (note2)	**Disable** Enable	LPSS HSUART #2 Support Enable\Disable.
LPSS PWM #1 Support (note2)	**Disable** Enable	LPSS PWM #1 Support Enable\Disable.
LPSS PWM #2 Support (note2)	**Disable** Enable	LPSS PWM #2 Support Enable\Disable.
LPSS SPI Support (note2)	**Disable** Enable	LPSS SPI Support Enable\Disable.

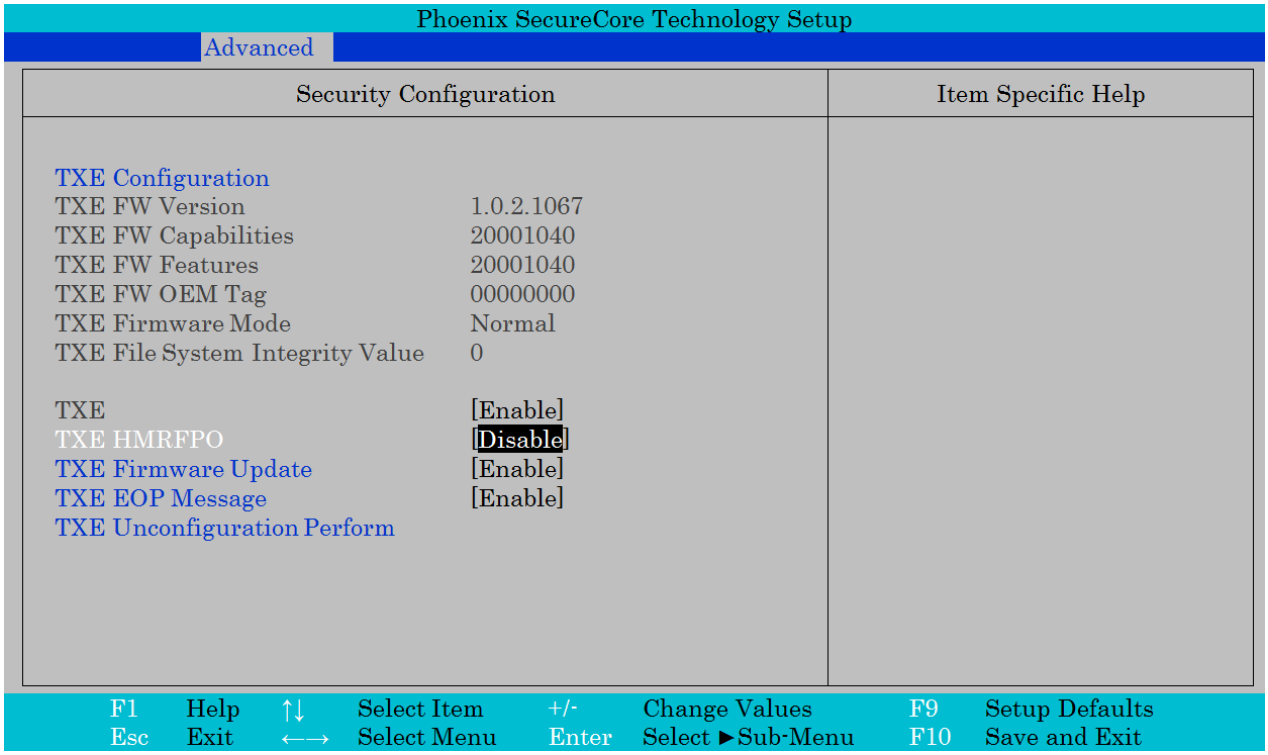
Note 1: Only selectable if *eMMC retune timer value = Enable*.
Note 2: Only selectable if *LPSS DMA #1 Support= Enable*.
Note 3: Only selectable if *LPSS DMA #2 Support= Enable*.

Miscellaneous Configuration



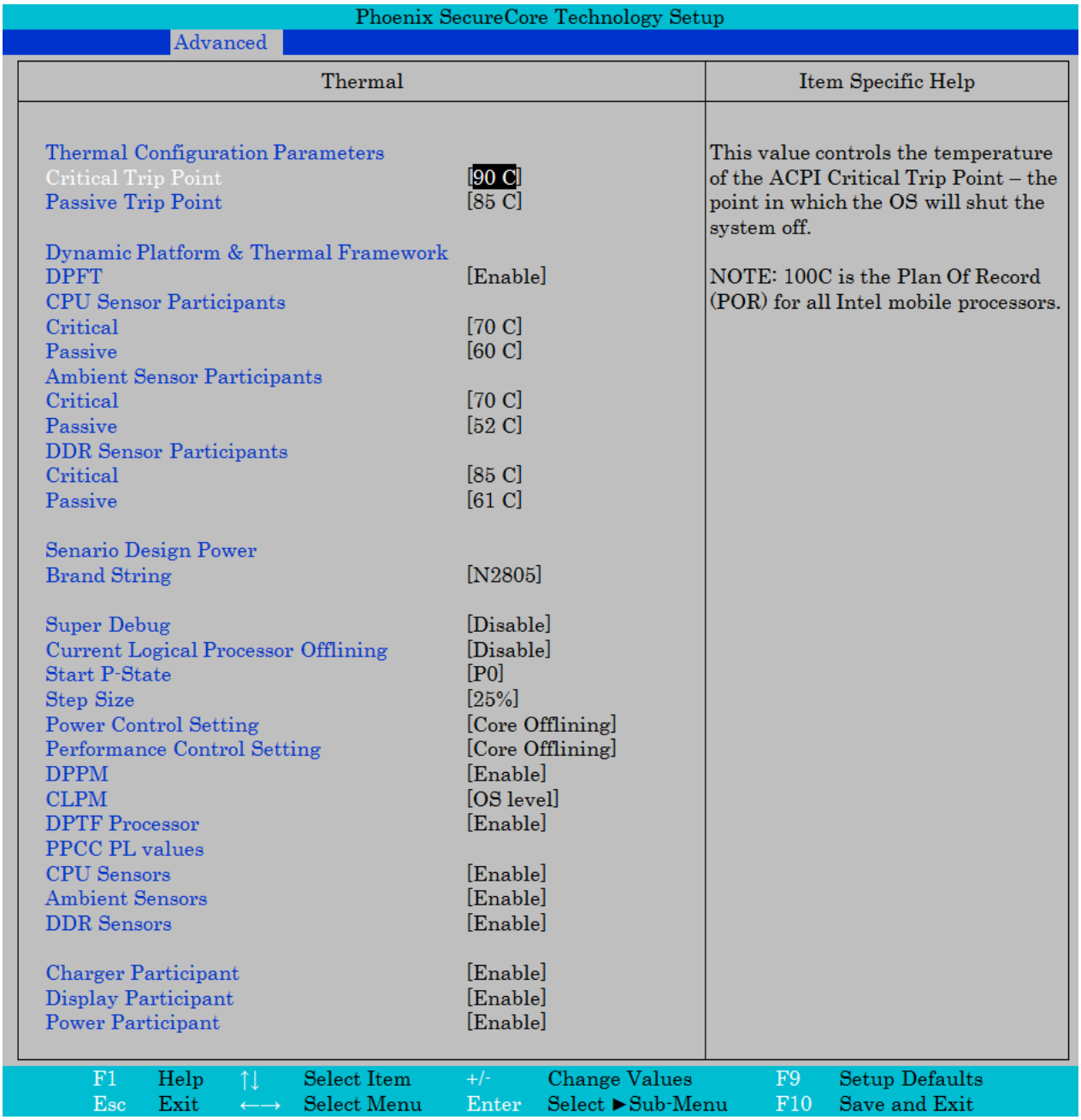
Function	Selection	Description
High Precision Timer	Disable **Enable**	Enable or Disable the High Precision Event Timer.
Boot Time with HPET Timer	**Disable** Enable	Boot time calculation with High Precision Event Timer enabled.
State after G3	**S0 State** S5 State	Specify what state to go to when power is re-applied after a power failure (G3 state).
Clock Spread Spectrum	**Disable** Enable	Enable Clock Chip's Spread Spectrum feature.
UART Interface Selection	Internal UART **Super IO UART**	Select which UART interface to use.
SMM LOCK	**Disable** Enable	Enable/Disable SMM Lock feature. It will lock the SMRAM and unable load SMM driver any more.
PCI Mmio Size	**2GB** 1.5GB 1.25GB 1GB	PCI Mmio Size.
NGFF Card Inserted	**No** Yes	Set 'YES' if NGFF Card is Inserted.
UHPAM Card Inserted	**No** Yes	Set 'YES' if UHPAM Card is Inserted.

10.3 Security Configuration



Function	Selection	Description
TXE HMRFPO	**Disabled** Enabled	
TXE Firmware Update	Disabled **Enabled**	
TXE EOP Message	Disabled **Enabled**	Send EOP Message Before Enter OS
TXE Unconfiguration Perform		Revert TXE settings to factory defaults.

Thermal

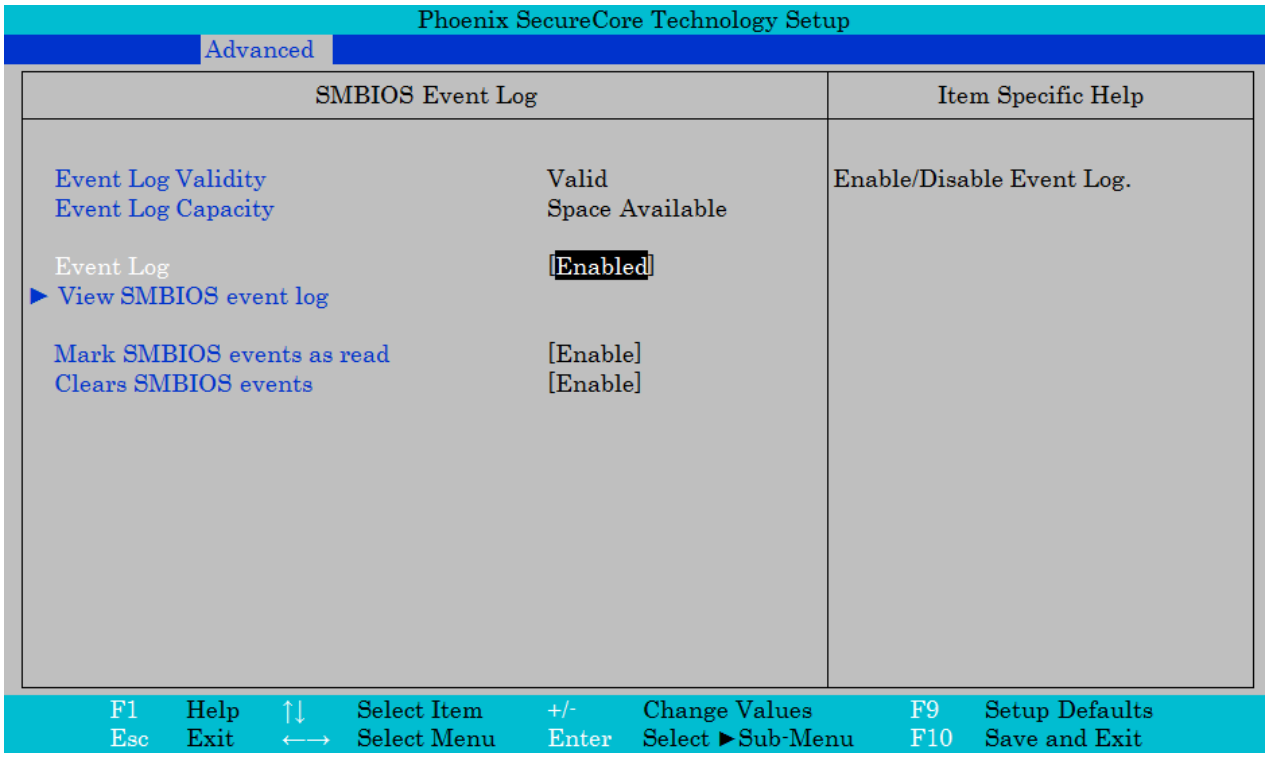

Phoenix SecureCore Technology Setup
Advanced
Thermal
Item Specific Help
Thermal Configuration Parameters
Critical Trip Point [90 C]
Passive Trip Point [85 C]
Dynamic Platform & Thermal Framework
DPFT [Enable]
CPU Sensor Participants
Critical [70 C]
Passive [60 C]
Ambient Sensor Participants
Critical [70 C]
Passive [52 C]
DDR Sensor Participants
Critical [85 C]
Passive [61 C]
Senario Design Power
Brand String [N2805]
Super Debug [Disable]
Current Logical Processor Offlining [Disable]
Start P-State [P0]
Step Size [25%]
Power Control Setting [Core Offlining]
Performance Control Setting [Core Offlining]
DPPM [Enable]
CLPM [OS level]
DPTF Processor [Enable]
PPCC PL values
CPU Sensors [Enable]
Ambient Sensors [Enable]
DDR Sensors [Enable]
Charger Participant [Enable]
Display Participant [Enable]
Power Participant [Enable]
This value controls the temperature of the ACPI Critical Trip Point – the point in which the OS will shut the system off.
NOTE: 100C is the Plan Of Record (POR) for all Intel mobile processors.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ←→ Select Menu Enter Select ▶Sub-Menu F10 Save and Exit

Function	Selection	Description
(Thermal Configuration Parameters) Critical Trip Point	15 C, 23C, 31 C, 39C, 47 C, 55 C, 63 C, 71 C, 79 C, 85 C, 87 C, **90 C**	This value controls the temperature of the ACPI Critical Trip Point – the point in which the OS will shut the system off. NOTE: 100C is the Plan Of Record (POR) for all Intel mobile processors.
(Thermal Configuration Parameters) Passive Trip Point	15 C, 23C, 31 C, 39C, 47 C, 55 C, 63 C, 71 C, 79 C, **85 C**, 87 C, 90 C	This value controls the temperature of the ACPI Passive Trip Point – the point in which the OS will begin to throttling the processor.
DPFT	**Disable** Enable	Enable/Disable DPTF.
(CPU Sensor Participants) Critical (note1)	25C, 35C,40C, ...,**70C**,...,125C	Critical Temperature.
(CPU Sensor Participants) Passive (note1)	25C, 35C,40C, ...,**60C**,...,125C	Passive Temperature.
(Ambient Sensor Participants) Critical (note1)	25C, 35C,40C, ...,7**0C**,...,125C	Critical Temperature.
(Ambient Sensor Participants) Passive (note1)	25C, 35C,40C, ...,50C **52C** 55C, 60C ...,125C	Passive Temperature.
(DDR Sensor Participants) Critical (note1)	25C, 35C,40C, ...,**85C**,...,125C	Critical Temperature.
(DDR Sensor Participants) Passive (note1)	25C, 35C,40C, ...,60C **61C** 65C,70C ...,125C	Passive Temperature.
Brand String (note1)	N3510 N2910 N2810 **N2805** J2850 J1850 J1750	Brand string for the processor, example Nxxxx or Jxxxx.
Super Debug (note1)	**Disable** Enable	Super Debug is for validation purpose.
Current Logical Processor Offlining (note1)	**Disable** Enable	Controls LPO Control preferences. Used only by Passive policy.
Start P-State (note1)	**P0**, P1, ...,P12	Instruct the policy when to initiate Active Core control if enabled.
Step Size (note1)	**25%** 50% 75%	Instruct the policy when to take away logical processors in the specified percentage steps.
Power Control Setting (note1)	**Disabled** Core Offlining	Instruct the policy wether to use Core offlining if Active core control is enabled to be used in P0 or when power control is applied.
Performance Control Setting (note1)	**Disabled** Core Offlining	Instruct the policy wether to use Core offlining if Active core control is enabled to be used in P1 or when performance control is applied.
DPPM (note1)	Disable **Enable**	Controls DPPM policies.

CLPM (note2)	Disable Enable Application specific **OS Level**	Current Low Power Mode.
DPTF Processor (note2)	Disable **Enable**	Enable/Disable Processor Participant Device.
CPU Sensors (note2)	Disable **Enable**	Enable/Disable CPU Temperature Sensors.
Ambient Sensors (note2)	Disable **Enable**	Enable/Disable Ambient Temperature Sensors.
DDR Sensors (note2)	Disable **Enable**	Enable/Disable Ambient DDR Temperature Sensors.
Charger Participant (note2)	Disable **Enable**	Enable/Disable Charger Participant Device.
Display Participant (note2)	Disable **Enable**	Enable/Disable Display Participant Device.
Power Participant (note2)	Disable **Enable**	Enable/Disable Power Participant Device.

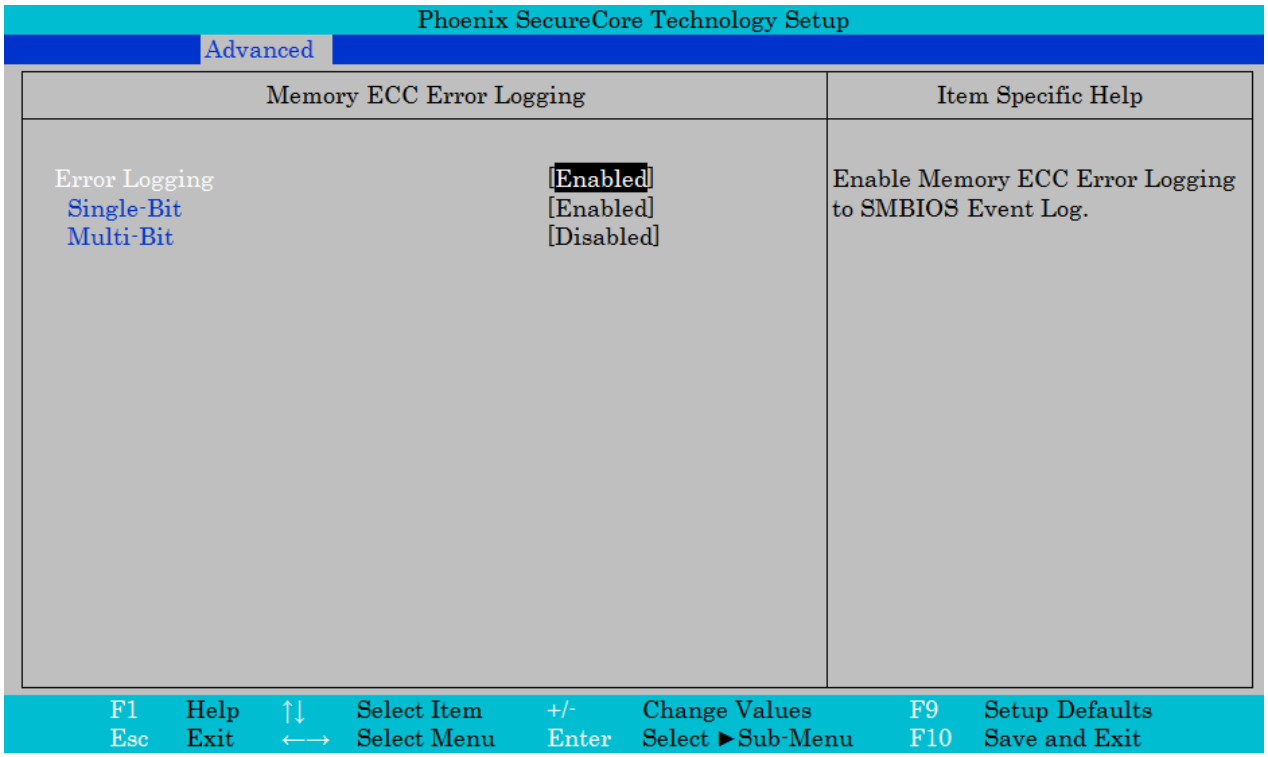
Note 1: Only selectable if *DFPT = Enable*.
Note 2: Only visible if *DFPT = Enable*.

SMBIOS Event Log



Function	Selection	Description
Event Log	Disable **Enable**	Enable/Disable Event Log.
Mark SMBIOS events as read	**Enter**	Mark SMBIOS events as read. Marked SMBIOS events won't be displayed.
Clears SMBIOS events	**Enter**	Clear SMBIOS events.

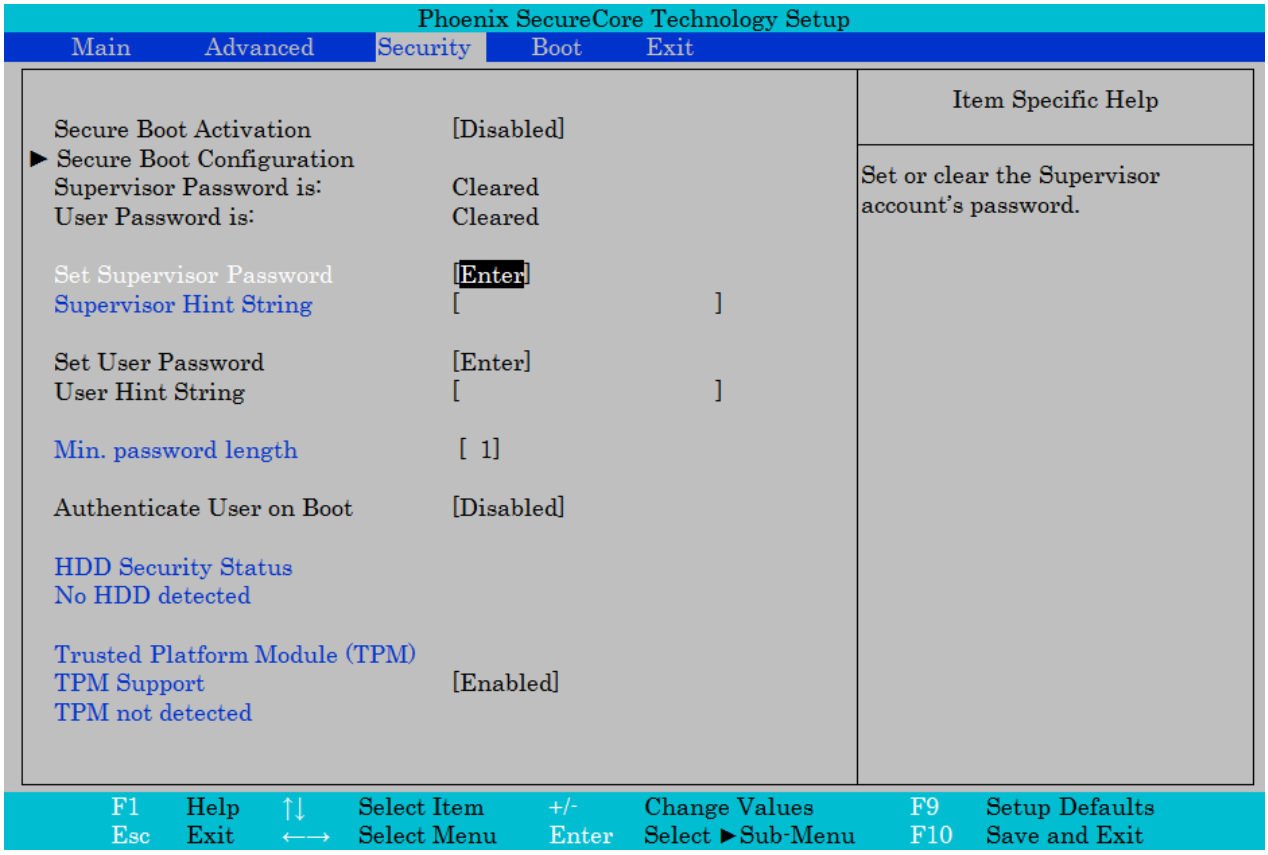
Memory ECC Error Logging



Function	Selection	Description
Error Logging	**Disable** Enable	Enable Memory ECC Error Logging to SMBIOS Event Log.
Single-Bit (note1)	Disable **Enable**	
Multi-Bit (note1)	**Disable** Enable	

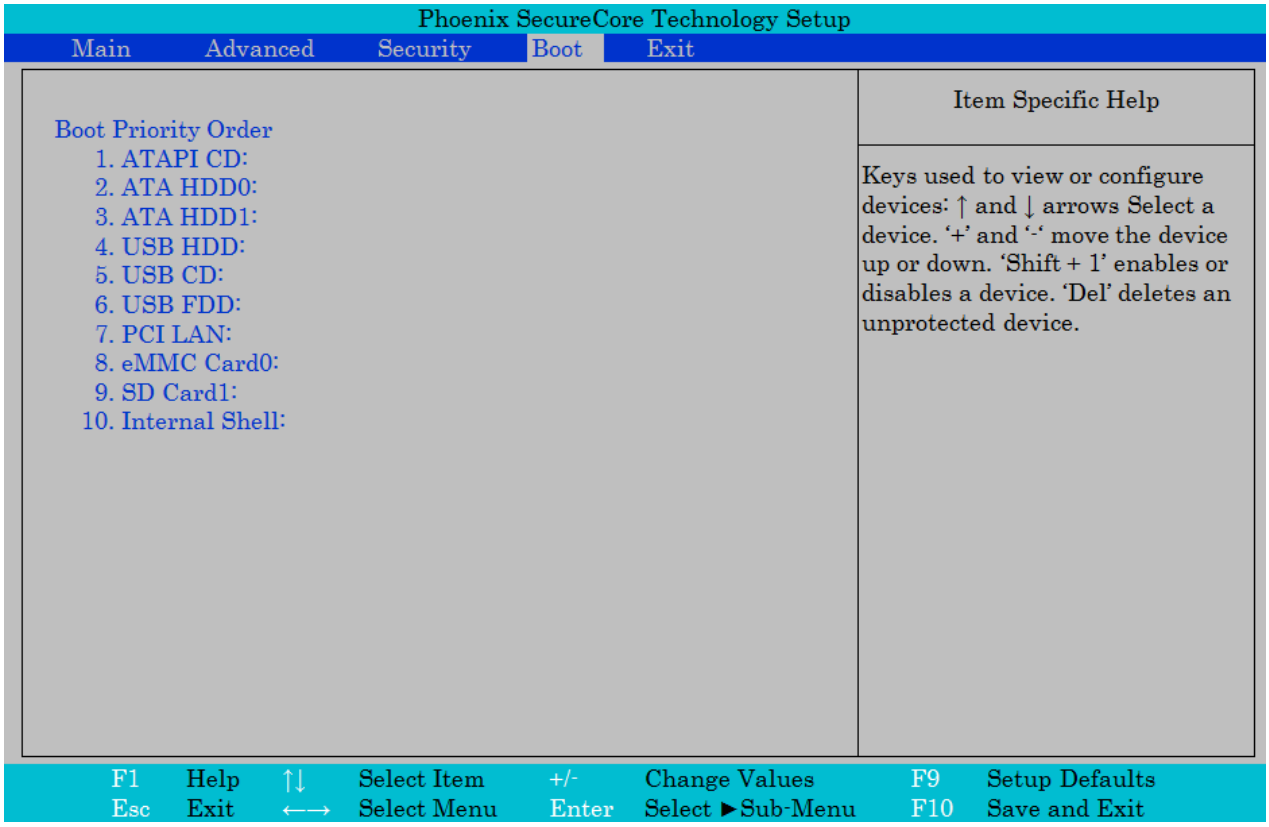
Note 1: Only visible if *Error Logging* = *Enabled*.

10.4 Security

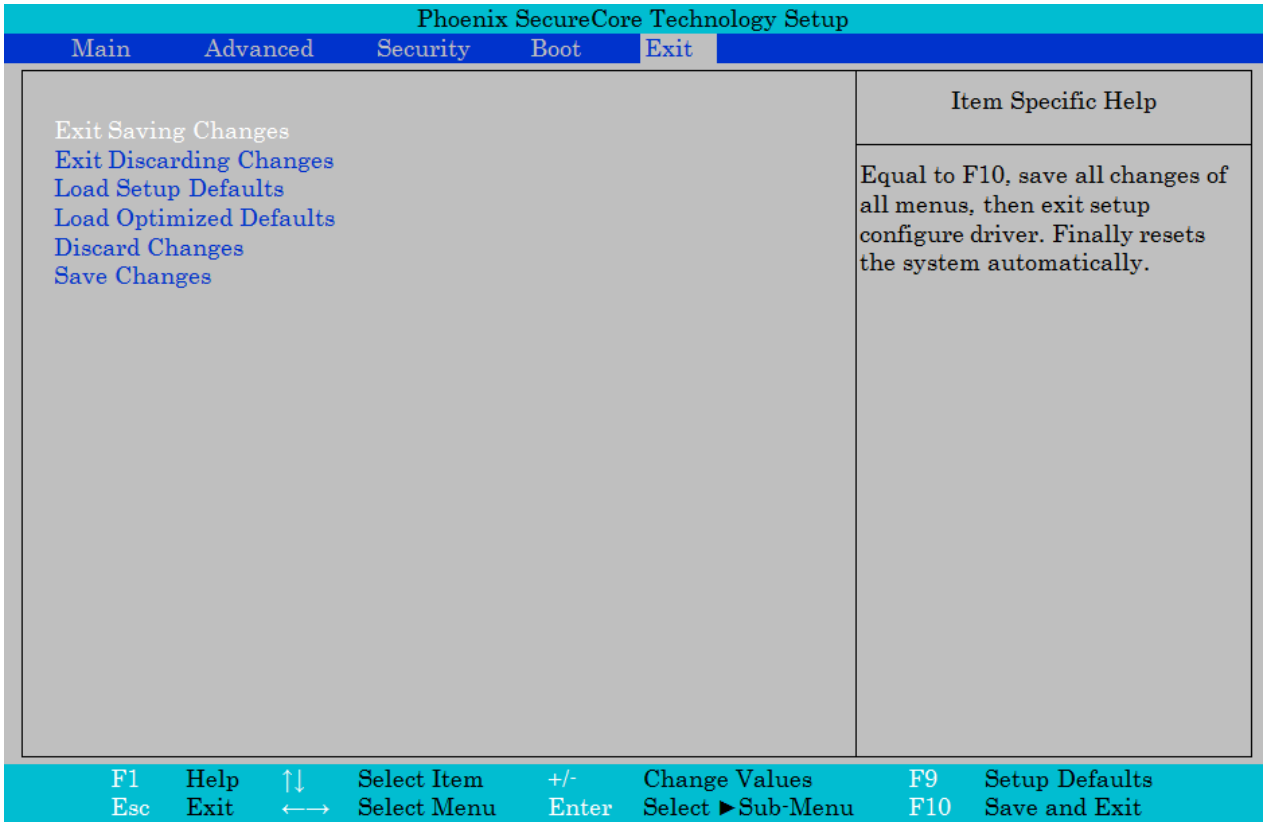


Function	Selection	Description
Set Supervisor Password	(up to 20 characters)	Set or clear the Supervisor account's password.
Supervisor Hint String	(up to 20 characters)	Press Enter to type Supervisor Hint String.
Min. password length	1, 2, ..., 20	Set the minimum number of characters for password (1-20).
TPM Support	Disabled **Enabled**	This is used to decide whether TPM support should be enabled or disabled.

10.5 Boot


Phoenix SecureCore Technology Setup
Main
Advanced
Security
Boot
Exit
Boot Priority Order
1. ATAPI CD:
2. ATA HDD0:
3. ATA HDD1:
4. USB HDD:
5. USB CD:
6. USB FDD:
7. PCI LAN:
8. eMMC Card0:
9. SD Card1:
10. Internal Shell:
Item Specific Help
Keys used to view or configure devices: ↑ and ↓ arrows Select a device. '+' and '-' move the device up or down. 'Shift + 1' enables or disables a device. 'Del' deletes an unprotected device.
F1 Help ↑↓ Select Item +/- Change Values F9 Setup Defaults
Esc Exit ←→ Select Menu Enter Select ▶Sub-Menu F10 Save and Exit

10.6 Exit



Function	Description
Exit Saving Changes	Equal to F10, save all changes of all menus, then exit setup configure driver. Finally resets the system automatically.
Exit Discarding Changes	Equal to ESC, never save changes, then exit setup configure driver.
Load Setup Defaults	Equal to F9. Load standard defaults values.
Load Optimized Defaults	Load settings for optimized boot time and system performance.
Discard Changes	Load the original value of this boot time. Not the default Setup value.
Save Changes	Save all changes of all menus, but do not reset system.